

RECORDS
of the
AUCKLAND
INSTITUTE AND
MUSEUM

RECORDS
of the
AUCKLAND INSTITUTE
AND MUSEUM

Volume 21 Part 1

AUCKLAND, NEW ZEALAND
1984

Editor

K. A. J. WISE

Editorial Committee

Professor Roger C. Green — Anthropology

Professor F. J. Newhook — Botany

Dr. J. E. Braggins — Botany

Miss Joan Robb — Zoology

ISSN 0067-0464

RECORDS OF THE AUCKLAND INSTITUTE AND MUSEUM

Vol. 21 Part 1 — 18 December 1984

Published by Order of the Council

G. S. PARK, Director

Auckland Institute and Museum
Private Bag, Auckland 1, New Zealand

RECORDS OF THE AUCKLAND INSTITUTE AND MUSEUM
VOLUME 21

CONTENTS

| | Page |
|---|------|
| ARCHAEOLOGY AND ETHNOLOGY | |
| Excavations at Pukearuhe (N99/49), North Taranaki, 1968. JOAN LAWRENCE <i>and</i> NIGEL PRICKETT | 1 |
| Observations on a Tongan nose-flute (<i>fangufangu</i>). ‘OKUSITINO MAHINA | 33 |
| Kites and windblown toys from Tikopia, a Polynesian outlier in the Solomon Islands. MICK PENDERGRAST | 37 |
| Maori dog-shape bowls. D. R. SIMMONS | 51 |
| The significance of decoration in a Maori meeting house. D. R. SIMMONS | 61 |
| BOTANY | |
| New and interesting records of adventive plants from the Auckland Institute and Museum Herbarium. 10. E. B. BANGERTER | 69 |
| ZOOLOGY | |
| Specimens of rare or recently extinct New Zealand non-passerine birds in the Auckland Institute and Museum. B. J. GILL | 77 |
| New species of intertidal Mesostigmata (Acari) from New Zealand. MALCOLM LUXTON | 83 |
| INDEX | 101 |

EXCAVATIONS AT PUKEARUHE (N99/49), NORTH TARANAKI, 1968

JOAN LAWRENCE AND NIGEL PRICKETT

AUCKLAND INSTITUTE AND MUSEUM

Abstract. The 1968 salvage excavations at Pukearuhe (N99/49), north Taranaki, are reported. Pukearuhe was for long a Ngati Tama fortification; in the period 1865-1885 it was occupied by European forces, firstly, imperial troops and Taranaki Military Settlers, later, Armed Constabulary. Ngati Tama and European occupation was based on the powerful strategic situation of Pukearuhe at the northern gateway into Taranaki. Excavations revealed evidence of the Maori and European occupation. Radiocarbon dates were obtained for Maori occupation. European material adds to the knowledge of sites relating to the period of military conflict in Taranaki which extended from 1860 to the early 1880s.

In 1968 Ken Gorbey was employed by the New Zealand Historic Places Trust to survey the route of the proposed Kapuni Natural Gas Pipeline from Kapuni in south Taranaki to Auckland and Wellington. During fieldwork, which began on 15 April and ended in July, a number of sites were located which were endangered by the pipeline work (Gorbey 1969). Within the 60 foot (18.3 m) construction easement were five clusters of pits, two terrace complexes, three pa, and one group of rifle trenches, probably of New Zealand War origin (Gorbey MS.a). A decision was made to concentrate salvage work on the pa, all three of which were in north Taranaki.

Two of the three pa were situated on a steep-sided spur on the south bank of the Mokau River. One of these, N91/3, was subject to some initial testing by Gorbey in May 1968 (Gorbey MS.b) and was more extensively excavated in early 1969 by Bruce McFadgen (1970a). The second, smaller, pa (N91/4) was not investigated. Both sites are now destroyed. The third pa to be affected by the pipeline work was Pukearuhe, N99/49, at the south end of Parininihi (White Cliffs). Salvage excavation was carried out by Gorbey at Pukearuhe from 9 August to 16 November 1968. Although the Ministry of Works funded the survey work it was unwilling to undertake full responsibility for salvage excavation; the work was therefore partly funded by the Historic Places Trust (McFadgen 1970b). The results of the Pukearuhe excavations are reported here. The present authors undertook the writing up of the excavations after Gorbey found he was without the time necessary to complete the work himself. The material and excavation notes are held in the Taranaki Museum, New Plymouth.

SETTING

Pukearuhe is located at the northernmost extremity of terrace country which extends along the coast in a narrowing strip from the Taranaki ring plain (Figs. 1,2). This terrace country ends abruptly at the 250 m high sea cliff of Parininihi (White Cliffs). South of Pukearuhe the terrace country is made up of successive marine terraces with overlying alluvium, mantled by volcanic soil derived from ash from Pleistocene and post-Pleistocene Pouakai-Egmont eruptions (Buist 1964:9-10). Behind the coastal terraces is steep and greatly dissected hill country of upper Miocene sandy mudstone ('papa') (Buist 1964:9). At the seaward margin of the terrace country are cliffs 35-90 m high which may or may not have a sandy beach below. The sea cliffs are topped by sand dunes, now fixed by vegetation, which provide excellent sites for a number of pa, such as the important Otumatua (N99/46) and Ruataki (N99/37), north and south of Waiiti Stream mouth (Buist 1964).

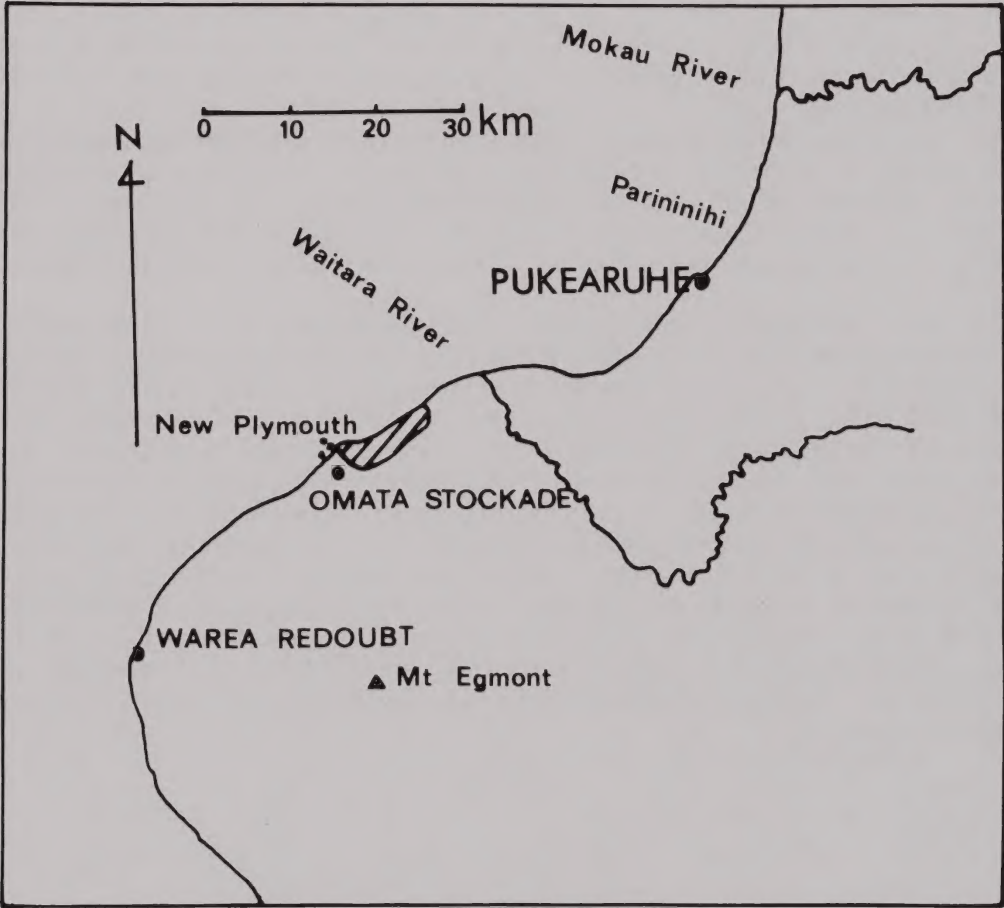


Fig. 1. Location of Pukearuhe and other places mentioned in the text.



Fig. 2. Pukearuhe from the east.

Photo: K. Gorbey, 1968

When the Pakeha first arrived in the Pukearuhe district the terrace country was already substantially deforested and was covered with flax, fern and toetoe with occasional groves of karaka and other broad-leaved trees. The steep hill country behind was under bush dominated by tawa and rewarewa with kahikatea and rimu in places. Today the terrace country and seaward faces of the hill country are under pasture with occasional remnant patches of bush. Some hill country is reverting to bush dominated initially by an association of manuka and mamaku. The name 'Pukearuhe' itself means 'fernroot hill'.

The pa, Pukearuhe, and subsequent military redoubt and settlement which occupied the same site, are now within the Pukearuhe Historic Reserve of 4.36 ha, administered by the Department of Lands and Survey. The reserve is in pasture. To the north is a 40 m cliff to the sea beach. At high tide the sea breaks against the cliff. To the south-east is the steep-sided gully of Waikaramarama Stream. West is a short gully which extends to the sea cliff. Pukearuhe is at the rear of a wide bay open to the north. Five hundred metres west is Pariokariwa Point where the coast resumes its normal south-westerly course. At the time of military occupation Opourapa Island stood off this point — a detached part of the general terrace country which was here more than 30 m high (Fig. 3). Opourapa has since been reduced to a wave platform (see Fig. 2). Pukearuhe Road now cuts the ridge at the southern extremity of the site and reaches the beach by way of the gully of Waikaramarama Stream.

HISTORY

Pukearuhe occupies a key strategic position at the south end of the 250m high cliff, Parininihi — the northern gateway into Taranaki. For many centuries this northern coast of what is now Taranaki was held by the Ngati Tama people. The Ngati Tama claim descent from Tama-ihu-toroa, great grandson of Tama-te-kapua of the Arawa canoe (Smith 1910:112); they are at the same time closely related to the neighbouring Ngati Mutunga and Te Atiawa of north Taranaki.

W. H. Skinner (in Smith 1910:253) writes that the Ngati Tama held the land south of the Mohakatino River, past Parininihi, to the pa, Titoki (which can still be seen by the road 4 km south of Pukearuhe). Skinner states that warfare 'existed' between Ngati Tama and their northern neighbours the Ngati Maniapoto for a period of 250 years. The heartland of the Ngati Tama lay north of Parininihi along the 'Poutama' coast. When Runga-te-Rangi, grandson of the eponymous ancestor Maniapoto, was killed at the great Ngati Tama pa, Te Kawau (see Prickett 1983:307), in the early seventeenth century, the Tainui people made reference to his father who had been killed at Tamaki in the saying "*Poutama ki runga; Tamaki ki raro*", meaning there is always war at Poutama to the south or Tamaki to the north (Smith 1910:252).

Recorded traditional history has little to say about Pukearuhe itself. There are indications that it was occupied at least as early as the first part of the eighteenth century (Smith 1910:253-254). Its key strategic position, however, suggests it was occupied for many generations, perhaps many centuries, before that. Te Puoho, who was killed at Tukurau in Southland in 1836, was living at Pukearuhe in the early nineteenth century (Smith 1910:295); in the early 1820s Pukearuhe people are reported at the first siege of Pukerangiora (Smith 1910:363). Not many years after, however, the Ngati Tama people abandoned their homeland and travelled to the Cook Strait region with other Taranaki tribes and the Ngati Toa of Te Rauparaha. The acquisition of guns by the Ngati Maniapoto and the other Tainui peoples had at last fatally upset the balance of power on the Poutama coast.

The strategic position of Pukearuhe was not taken up again until 1865 when Pakeha troops occupied the old pa to bar entry from the north into Taranaki. The immediate reason for the occupation of Pukearuhe was a report received in New Plymouth that the Ngati Maniapoto were expected at Kaipikari (inland of Urenui) in support of Wiremu Kingi's Te Atiawa people. (The following paragraphs are derived from Prickett 1981:176-187).

Early in the morning of 24 April 1865 the "*Phoebe*" arrived off Pukearuhe from New Plymouth with 160 70th Regiment and 60 Taranaki Bushrangers, all under Colonel Mulock, 70th Regiment. Because of deteriorating weather and mismanagement only part of the force was landed. Nonetheless, as Wiremu Kingi Matakatea of the Taranaki tribe put it, this movement "shut the gate" against Maori incursions from the north. By mid-May a redoubt was thrown up which, by the end of the month, was garrisoned by Captain Ralston, two officers and 69 men of the 70th Regiment, four officers and 76 men of the Taranaki Military Settlers and two men of the 43rd Light Infantry, a total force of 154. A substantial two-storied blockhouse was completed within the redoubt by the end of September.

In late 1865 there was almost daily skirmishing between the garrison and a large party of Mokau Maoris who had camped in the Waipingau gully to compete for the cargo of the "*Alexandra*" which went ashore a mile north of the redoubt on 9 August. On 25 November a party of Ngati Maniapoto advanced from the north beneath Parininihi and shots were exchanged on the beach about the mouth of Waikaramarama Stream. Later in the day there was an attempt to ambush some Military Settlers who were cutting fern south of the redoubt.

The 70th Regiment was withdrawn towards the end of August 1865, thereafter Pukearuhe Redoubt was held by Taranaki Military Settlers. Initially there were 100 Military Settlers with four officers. Despite the remoteness of the post, however, the garrison was steadily reduced throughout 1866 and 1867. In mid-September 1866 Captain Page was in command of 65 men of 9th Company, T.M.S. By May 1867 Captain Page's company had left Pukearuhe to a small force of Military Settlers under Lieutenant Gascoigne. The remaining 25 men (now a militia force) were ordered from the post in May 1868.

On 13 February 1869 Maori raiders from the north killed the remaining occupants of Pukearuhe and burned down the blockhouse. Those killed were Lieutenant Gascoigne his wife and three children, two other men and the Reverend John Whiteley who had arrived at the post towards evening (see Cowan 1923:295-301). Pukearuhe was now abandoned for almost four years. The northern frontier of Pakeha Taranaki was withdrawn to the south bank of Papatiki Stream at Waiiti. Two redoubts were thrown up here, occupied respectively by Armed Constabulary and Bushrangers. The garrisons patrolled occasionally to Pukearuhe 4 km northward.

On 11 September 1872 a party of Armed Constabulary under Inspector Tuke marched forward from Waiiti Redoubt and reoccupied Pukearuhe. The redoubt was renewed and a new blockhouse built. Thereafter a strong garrison was maintained at Taranaki's northern frontier post. In 1873 there were 38 Armed Constabulary at the post, and more than a decade later, in June 1884, there were still one officer, four non-commissioned officers and 26 men. Pukearuhe was finally abandoned on 26 November 1885.

During the thirteen years of Armed Constabulary occupation of Pukearuhe the garrison was employed in road and bridge building, patrolling the ranges eastward and north to Tongaporutu River, maintaining their fortification and quarters and providing for themselves by extensive gardens on both sides of the Waikaramarama Stream (Figs. 3,4). An excellent account of life at the frontier post is given, in his book *Frontier Life*, by the surveyor E. S. Brookes (1892).

The continuities are clear between Ngati Tama and later Pakeha occupation of Pukearuhe. Both defended the northern route to the fertile Taranaki lowlands. Both held the strategic position against the Ngati Maniapoto and other Tainui tribes. The Ngati Tama abandoned their tribal land and fortresses when they could no longer withstand their old enemies who had acquired new weapons. The Armed Constabulary finally left Pukearuhe only after the opening up of the King Country to the Pakeha removed the threat to Taranaki's northern frontier.



Fig. 3. Pukearuhe from the east showing the Armed Constabulary settlement of the 1870s and early 1880s. Opourapa Island can be seen in the background.

Photo: Taranaki Museum



Fig. 4. Pukearuhe from the west showing the Armed Constabulary settlement of the 1870s and early 1880s. The main excavation of 1968 took place where the houses can be seen at the extreme right.

Photo: Taranaki Museum

THE SITE

The remains of Pukearuhe pa and subsequent military occupation cover a roughly triangular piece of ground *ca.* 170 m across and 225 m long at its greatest extent (Fig. 5). The greater part of the site consists of three platforms. At the south end, above Pukearuhe Road, is a curving platform 130 m long and nowhere more than 30 m wide. At the southern extremity of this platform is a small cemetery with graves dating from the Armed Constabulary period and after. To the west of and below the southern platform are two major terraces, the upper one of which was the scene of the major part of the 1968 excavation (Fig. 5).

The southern platform and associated terraces are separated from the second, central, platform by a cutting 3-6 m deep by which the old road crossed the site to curve steeply down to the beach at the south side of Waikaramarama Stream. The central terrace is *ca.* 65 m long and 55 m across. It is divided in two by a road which gave access to this platform. At the south-west corner of the platform is a memorial to the Rev. John Whiteley, with, some 20 m away on the edge of the old road cutting, a plaque marking the spot he was killed. At the south-east corner of the platform are the remains of the last redoubt at Pukearuhe. Ditches mark off an area *ca.* 22 x 22 m. These remains date from the final small defensive work of 1879, prior to this there was the original redoubt of 1865 and the first A.C. work of 1872 (see Prickett 1981:184-186). Until the 1930s a blockhouse stood over the gap in the ditch at the redoubt's north-west angle (pictured in Cowan 1923 II:300). Below the platform to the west are the remains of perhaps five terraces, at least some of which had buildings on them during the A.C. period. The cliff edge is eroding and some part of this central platform is now lost.

At the north-east end of the central platform is a 25 m wide dip. Beyond this, at the north end of the site, there is the third major platform. Within the dip are the remains of three hearths which mark the house of Captain W. B. Messenger, in command at Pukearuhe throughout the Armed Constabulary period. The northern platform beyond is *ca.* 50 m long and a little more than 15 m wide. Below it the old road curves down to the beach. The name 'Punaruku' is given to this platform (for example on N.Z. Cadastral Map — County Series (NZMS 15), Clifton County 1959). At the north side of the platform is considerable erosion of the sea cliff.

Some documentary evidence of the shape of the Maori fortification is given on a "Plan of Puke-a-ruhe" now held in the Taranaki Museum. This map is signed by "Ted C. Wilton / from original / 16/7/30". The original has not been found. The Wilton copy shows the redoubt and buildings of the 1865-69 occupation. Punaruku is marked "Piquet Hill" with the inscription, "Commanding the Beach and the only practicable approach from the White Cliffs. This Hill exhibits traces of having once been fortified ...". At the westerly end of the platform is marked an "old parapet (destroyed)" — this being a typical rim bank of the most vulnerable end of a pa platform. Outside, in the dip later taken up by the Messenger house, are two ditches separated by a bank (all since destroyed). The road cutting which now separates the two major platforms is described as a "Trench between the two Pahs now partially filled up", showing that this was originally part of the Maori defences. The southern platform is also marked as having been fortified, although no particulars of this are shown except for the two terraces (the site of the excavation) at the west side.

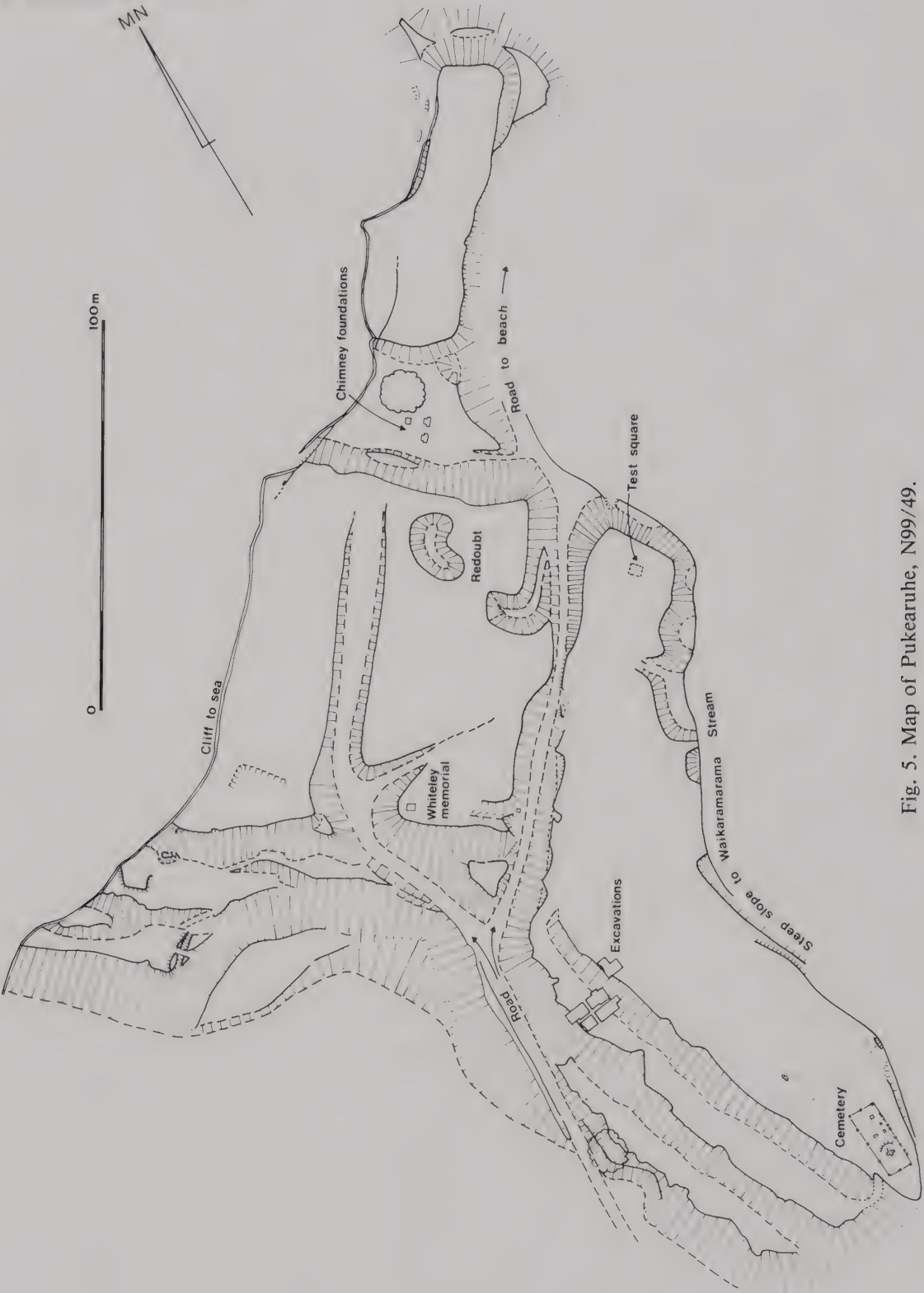


Fig. 5. Map of Pukearuhe, N99/49.

THE EXCAVATION

The place chosen for the main excavation was at the point where the pipeline was routed through the upper of two large terraces which extend along the western side of the major southern platform of the site (Fig. 6). Here a 4 m grid was laid out, with 3 m squares excavated within the grid allowing 1 m baulks. These squares were subsequently enlarged as required, most importantly over the front of the terrace (AI) and up the rear scarp (DII; see Fig. 8). A total of 63.85 m² was investigated. Other minor investigations took place at the western rim of the platform immediately above the main excavations, where 18.25 m² was excavated, and at the far, north-eastern, end of the same platform where a 3 m square was laid out and *ca.* 3.5 m² test excavated within it. (See Fig. 5 for location of excavated areas).

Terrace excavation

At the main or terrace excavation it was hoped that Maori occupation levels would be protected by redeposited material from the scarp above. This turned out to be partly the case: redeposited material covered half the terrace width. From the middle of the terrace to the outer edge, however, the Maori surface was substantially damaged. The terrace is *ca.* 3 m below the platform, and results from a single 'cut and fill' operation (Fig. 7). The natural slope is preserved under the deep fill of this outer part of the terrace.



Fig. 6. Pukearuhe, 1968. The main excavation can be seen in progress on the upper terrace.
Photo: K. Gorbey

Excavated layers of the terrace may be described in two parts: the inner part of the terrace (C and D, Fig. 7), and the outer fill deposit (A and B, Fig. 7). Fig. 7 clearly shows the 'cut and fill' nature of the terrace: the rear part of the terrace was cut down more than 1.5 m from the original ground surface, this material then being thrown out to build up the front part of the terrace.

At the base of the old cut is a *rua* now *ca.* 1.3 m deep (Figs. 7,8). This underground storage pit was two-thirds filled with fine grey-brown soil wash, tending to clay at the bottom, which was the result of erosion from the steepened terrace scarp. Above was loose mixed lumps of soil and clay. Within the narrow entrance was a clay plug which had resulted from the entrance-way breaking off and falling into the pit. On top of this plug was a thin layer of black soil. On the uphill side, 25 cm above the *rua* entrance, is a compacted path which clearly belongs to the European occupation — this probably explaining both the rapid filling to the top part of the *rua* and the collapsed rim. The remainder of the excavated section here, more than 1 m deep in places, is made up of soil and some marked clay lenses which have eroded from the scarp and nearby platform rim. At the top of this is a second European path which must clearly be a late feature. The large open pit of Squares CII and DII is projected on to the section drawing.

At the outer part of the terrace the stratigraphy may be grouped into five general levels. At the bottom, a highly distinctive sloping face indicates the original ground surface. There was an extensive thin but concentrated scatter of charcoal on this surface, a sample of which was subsequently radiocarbon dated. It is argued that this charcoal results from the burning of fern and scrub prior to the building of the terrace. Above the sloping surface are a series of terrace foundation layers of successive deposits of topsoil and clay — the whole being as much as 1.4 m deep. On top of this fill are two shallow compacted layers, totalling no more than 10 cm depth. The upper one is a clay floor from which most Maori features have been dug, although it has suffered a good deal of subsequent damage and is completely missing in parts. Few postholes or hearths can be traced to the lower part, consisting of compacted grey sandy soil, except in places where the upper part is missing. On top of the Maori floor is a lower soil horizon, above which the present topsoil (with rare intrusions into lower levels) contained all the European artefacts found.

Four pits were uncovered on the excavated terrace: one open pit (Pit 1), two underground *rua* (Pits 2 and 3) and one feature which Gorbey argues (in field notes) was a *rua* in the process of construction (Pit 4). As well as the four major pits the excavator identified a number of small round pits, generally with lips smaller than their greatest diameter. These could not have held much and their actual use is uncertain.

Pit 1 is 3 x 2.45 m in plan (Figs. 8-10). The depth, possibly truncated by subsequent cutting down of the terrace, was found to be 1 m. In the centre of the short west wall was an access step. At each end wall were four post holes, these being matched down the length of the pit by four lines, each probably containing four postholes which were dug into the floor. Gorbey argues that there may have been a sequence of two pits here. The first, 2 x 2.45 m, extended only to the four postholes linked by a shallow trench in a manner reminiscent of the lines of postholes at end walls.

The second pit resulted from an extension to this first square pit. The large number of postholes in the pit form a clear pattern dominated by four lines of six posts. It is likely that they held up the roof and, for so many to be needed, Gorbey's field notes contain the suggestion (following an idea put forward by the late Mr Rigby Allan of Taranaki Museum who had seen this elsewhere in Taranaki) that the roof was covered over with heavy turf. It will be seen in Figs. 8 and 10 that there are additional postholes adjacent to the row nearest the east end; these may represent replacement. The extra pair on either side of the central passage might be additional support for the roof. Along the centre were two shallow depressions where fires were lit (see Fig. 8). A stone sinker (Fig. 17) was found on the floor of the pit.

Pit 2 is an underground *rua* with vertical entrance found in Square DI. When the 2 m high section above the pit collapsed at the end of the excavation part of the old terrace scarp was revealed, exposing the remains of a larger vertical approach to the narrow entranceway shown in the section drawing (Fig. 7). The floor of the pit was shown to be 2.5 x 1.75 m in size. The height of the chamber was generally *ca.* 1m. Just beneath the collapsed plug of the *rua* entrance was found an adze (Fig. 13). The entranceway itself was full of European material, apparently dumped in this convenient hole.

Pit 3 (Square CII) was also an underground *rua*, now filled with waterlaid silt. Like Pit 2 it was entered vertically (the entrance can be seen in Fig. 9). Again like Pit 2, an unknown depth of covering soil was removed during subsequent use of the terrace. The pit floor plan was 1 x 1.45 m. The chamber was as much as 65 cm deep. From the vertical entrance way the walls descended to the floor at a 45° angle unlike the rounded chamber of Pit 2. The surviving depth from floor to entrance lip was 92 cm. A massive cobble 'chopper' was found just inside the entranceway (Fig. 16). In his field notes Gorbey argues for Pit 4 on the basis of a partly dug vertical *rua* entrance in Square BII.

Pits 2 and 3 are typical of smaller Taranaki *rua* and are comparable in size and kidney-shaped floor with Rua A at Ngaturi, the pa which lay beneath the Omata Stockade (N108/39; see Prickett 1981:374-375). The Pukearuhe pits were not all in use at the same time. Pit 1 is cut into the fill of Pit 3 and thus clearly post-dates it. The 4 cm of natural soil which separates the chamber of Pit 2 and the floor of Pit 1 could hardly have remained intact if both those pits were in use at the same time. An argument might be made, however, for Pit 2 being first because its makers might have anticipated trouble from weakly consolidated fill if Pit 1 was earlier. Thus it might be argued that both *rua* are earlier than the open rectangular pit.

A large number of *hangi* scoops or hearths were found on the terrace, concentrated in Square BI but also in BII and CI. Most of these scoops were only 10-20 cm deep or less and most contained charcoal. The unusually large scoop in Square BII contained charcoal from a single large piece of wood (Fig. 11). Ovenstones were rare or absent. Some scoops, such as the two uncovered in the narrow extension on the north side of Square CI, contained no charcoal but followed the form of other hearths so have been included among them in Fig. 8. Charcoal collected from two hearths in Square BI was radiocarbon dated.

The many postholes, especially in Squares BI and BII, nowhere fell into a clear pattern.

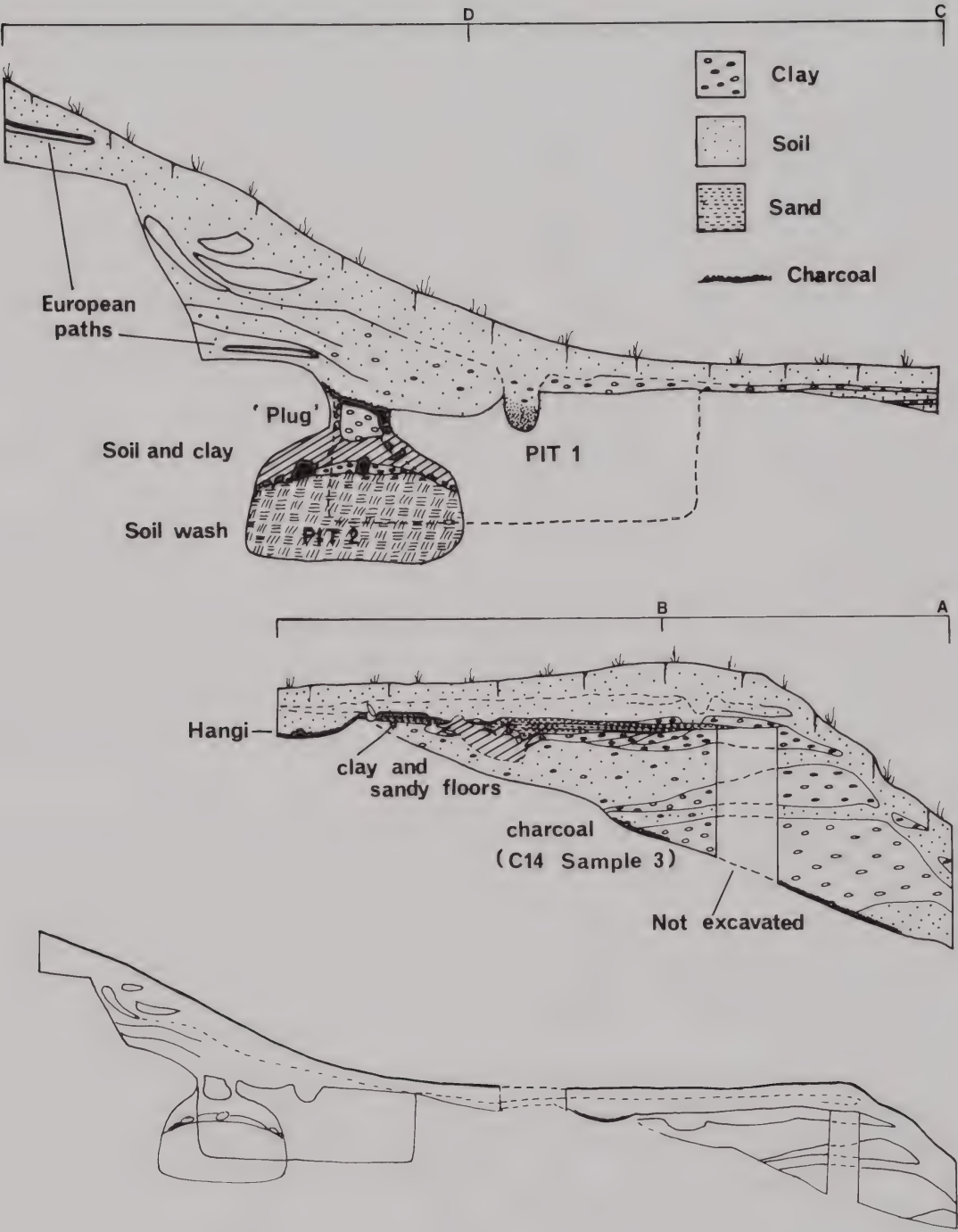


Fig. 7. Pukearuhe: terrace excavation cross-section.

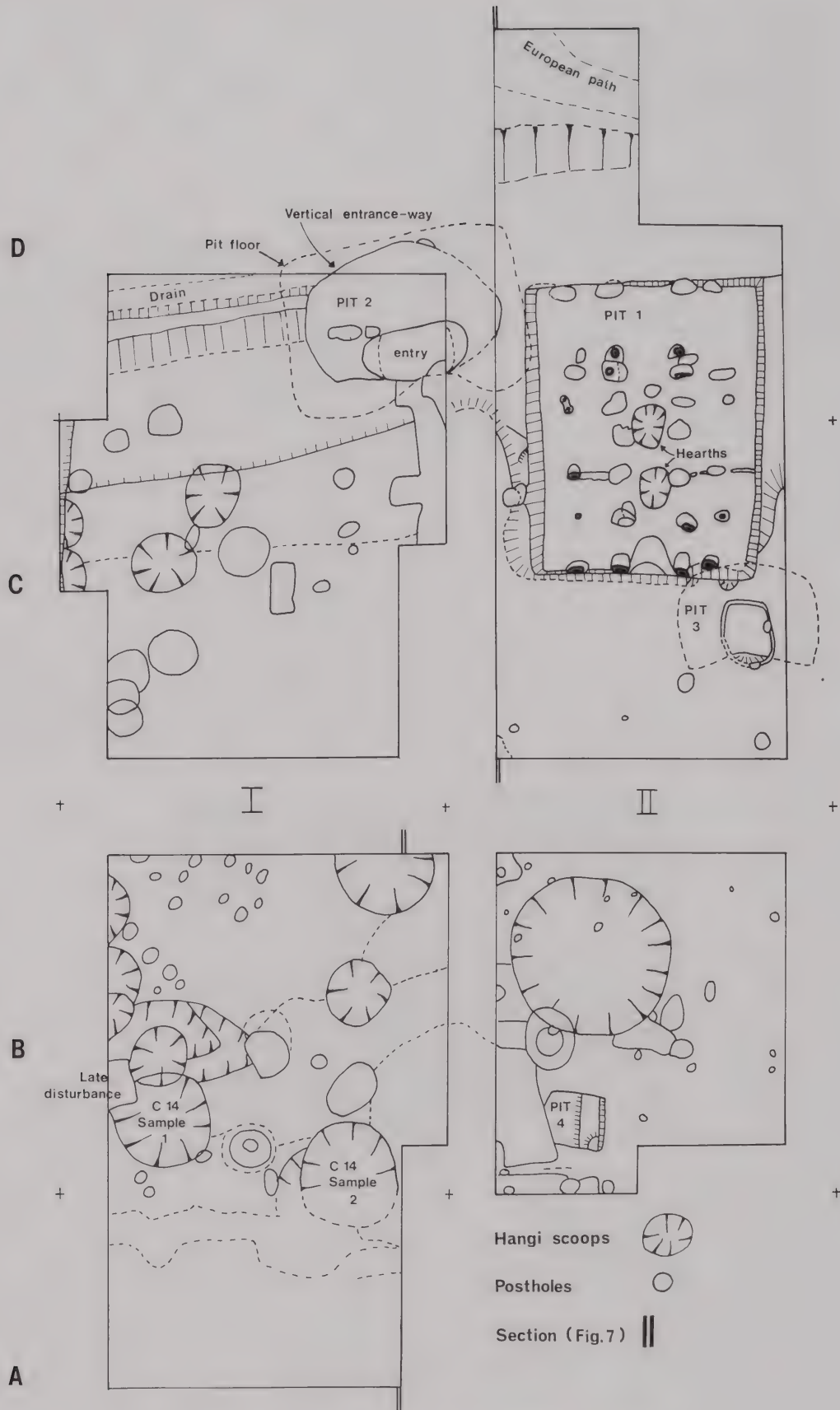
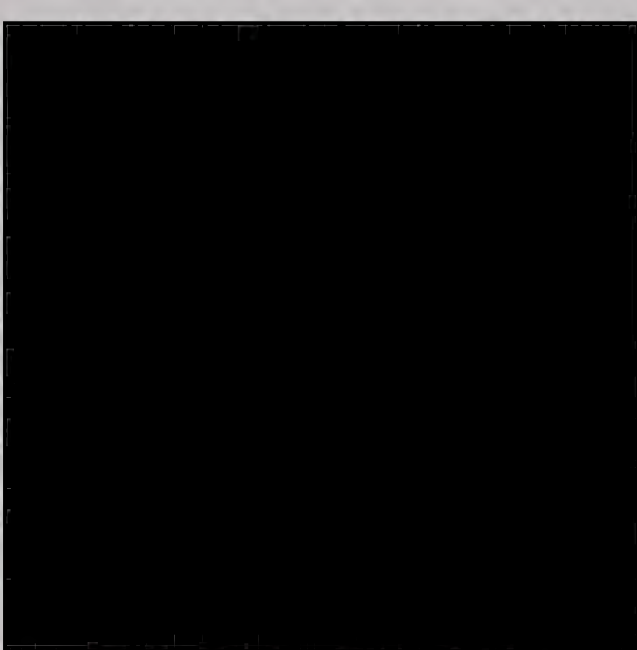


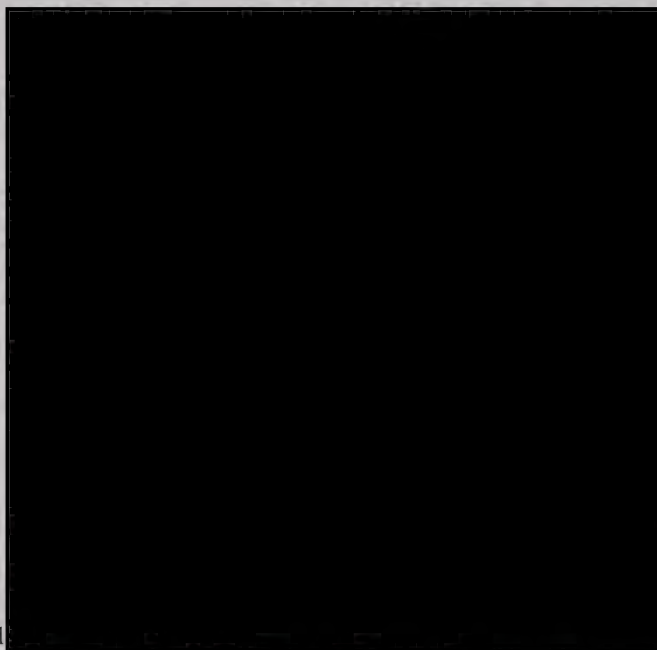
Fig. 8. Pukearuru: plan of terrace excavation.



9



10



11

Figs. 9-11. 9. Pits 1 and 3 (the entrance to Pit 3 can be seen right foreground). 10. Vertical picture of Pit 1 floor. 11. Partially excavated large *hangi* in Square BII; view from north-east corner of square (see Fig. 8).

Photos: K. Gorbey

Platform excavation

On the platform rim immediately above the main terrace excavation an irregular area of 18.25 m² was opened up (see Fig. 5). It was anticipated that this part of the Maori site would be substantially damaged by European occupation and recent cultivation. It turned out, however, to be reasonably intact beneath the plough zone. The stratigraphy of this part of the site included a very sandy layer beneath the turf; beneath this was a distinct clay surface with ash lenses and post holes dug into it.

The plan (Fig. 12) shows postholes and other features concentrated near the scarp edge. Closest to the scarp edge is a row of five postholes which marks the line of a palisade. The postholes were between 10 and 26 cm deep and indicate a lightly palisaded internal division rather than strong defensive work. Less than a metre within the palisade were the remains of a stone-lined hearth — two stones enclosing concentrated ash. European artefacts were found in an intrusion cut into this hearth. A line of postholes on the east side of the hearth probably marks the side wall of a

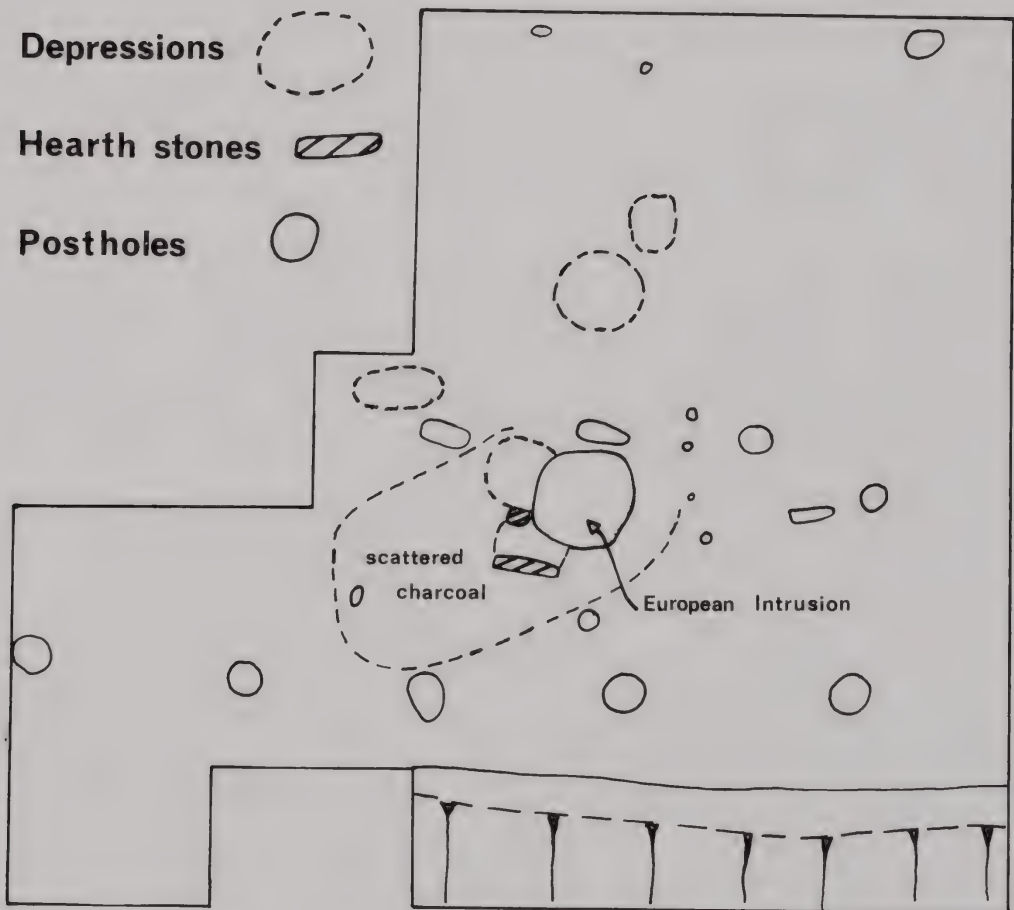


Fig. 12. Pukearuhe: plan of top platform excavation.

tiny rectangular building which, if centred on the hearth, can have been little more than a metre wide. Two postholes between the hearth and palisade may mark the other wall.

Test square

The far end of the platform (see Fig. 5), a test excavation within a 3 m square revealed the corner of an open rectangular pit *ca.* 1.35 m deep. A step down indicates that this was the end of a pit, which, if the step was central was *ca.* 3 m wide.

THE ARTEFACTS

Maori

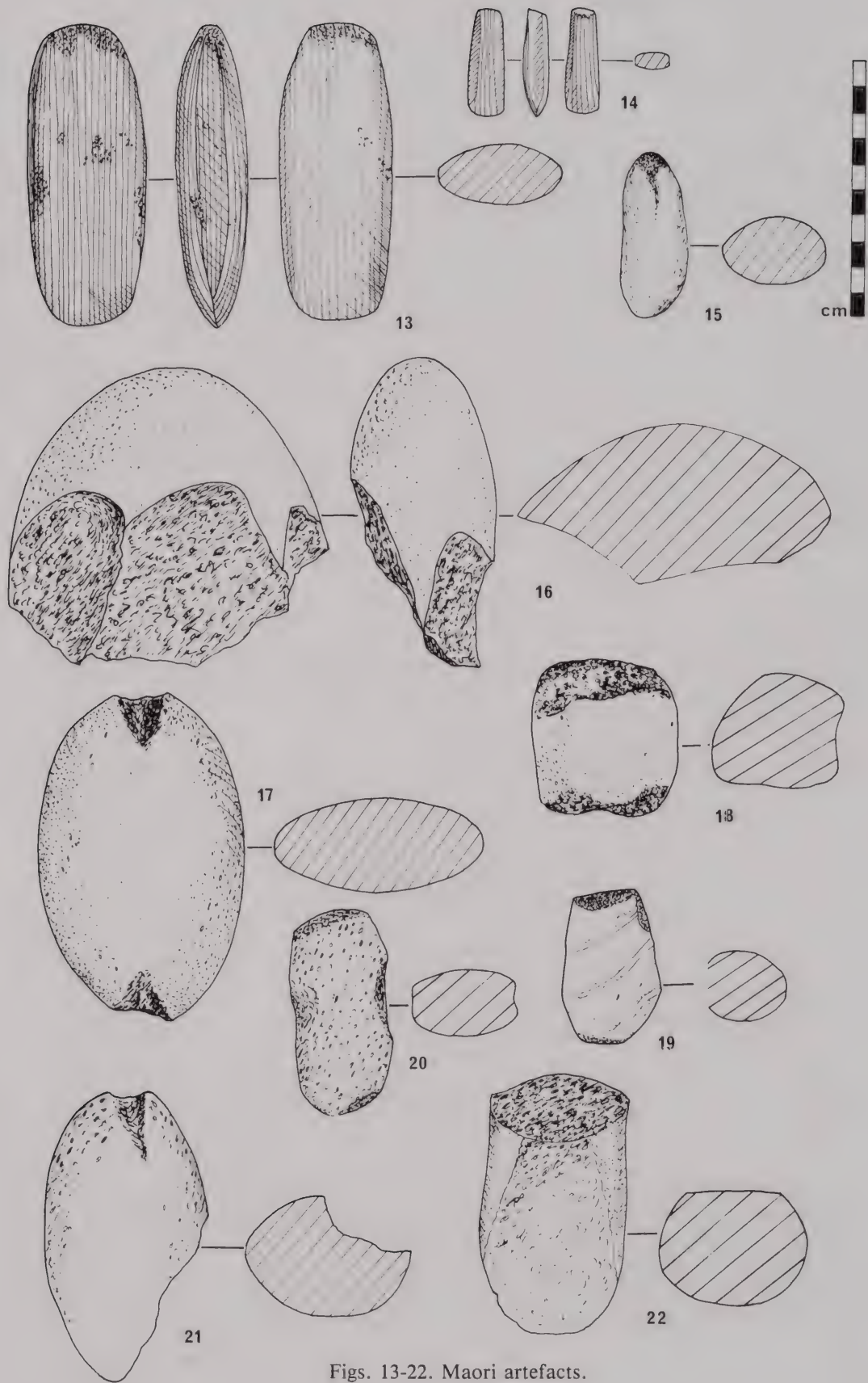
Maori artefacts found at Pukearuhe are limited to stone material. They include an adze and adze fragments, sinkers, hammerstones and flakes. The material is treated here as a single assemblage.

The only complete adze was from Pit 2 (Fig. 13). Made of a highly characteristic Taranaki adze material, a flecked green andesite, it is almost lenticular in cross-section and not quite evenly bevelled back and front. It has an all-over polish with some hammerdressing of the butt. Two fragments of a larger highly polished adze in dark grey fine grained indurated sandstone were found together on the Maori occupation surface in Square CII. One of the pieces may have traces of *kokowai* adhering to it. A well-finished 44 mm long, chisel in *inanga* bowenite came from the same level in Square CI (Fig. 14).

Three sinkers were found. Two came from the large rectangular pit: one from the fill and one from the floor. Within the clay packing of a posthole was a broken sinker (Fig. 21) of indurated sandstone — the remaining end is bruised for attachment. Within the pit fill was a flat oval sinker bruised at both ends for attachment (Fig. 17). It is made of andesitic material. The third sinker is made of coarse andesite (Fig. 20). It was found in Square CII and has been hammered at both ends as well as being notched at the sides for attachment.

The massive 'chopper' from within Pit 3 fill is made of a water-rolled cobble of indurated sandstone (Fig. 16). As few as six flakes struck off the cobble have left a useful cutting edge. *Kokowai* traces remained on the flaked area.

Ten hammerstones were found, of which four are illustrated. Fig. 19 depicts a surface found, small hammerstone, made of a quartz-veined sandstone. It is strongly battered at both ends. A broken elongated cobble of greywacke (Fig. 22) has been greatly reduced on one side (and broken subsequently). A hammerstone of tough chert-like material (Fig. 18) is much used at both ends. A small water-rolled pebble of indurated sandstone (Fig. 15) has slight bruising at one end. Other hammerstones included three of tough quartz cobbles and others of chert and sandstone. All were of water-rolled material. All the hammerstones were found in Squares CII and DII.



Figs. 13-22. Maori artefacts.

Fourteen stone flakes were recovered at the site. Five of indurated sandstone show edge damage, another two of the same material have ground edges that result from use as attrition saws. Two greywacke and two indurated sandstone flakes are polished on one side and were presumably struck off adzes. A fire-blackened flake of 'chipwacke' comes from a hammerstone. A greywacke flake was found in posthole fill in Square CII directly beneath a brick. Other stone material in the site is restricted to ovenstones which were occasionally found in *hangi* scoops in Squares BI, BII and CII.

European

Among artefacts from the Pukearuhe site, European material vastly predominated. Like the Maori material it is presented here as a single assemblage. Most European material was associated with the path and drain which ran along the upper margin of Squares DI and DII. Much of it was found in the mouth of the collapsed *rua* (Pit 2) beneath the path.

Glass. Among the more abundant material was glass. It can be briefly summarised by weight as follows: aqua bottle glass 2665 g (44.5% of bottle glass); green bottle glass 1284 g (21.4%); 'black' bottle glass 1008 g (16.8%); blue bottle glass 747 g (12.5%); colourless bottle glass 287 g (4.8%); window glass 244 g. The total of bottle glass is 5991 g.

Aqua bottle glass ranges from pale green to a deeper blue-green. Among the bottles are salad oil, relish and vinegar containers, medicinal bottles and others of unknown contents. Medicinal bottles include an intact DAVIS/VEGETABLE/PAIN KILLER (Fig. 45), of different shape to the 1860s example found at the Omata Stockade (Prickett 1981:415), and two bottles of similar shape, again intact, which are embossed BARRYS'/TRICOPHEROUS FOR THE SKIN AND HAIR/NEW YORK/DIRECTIONS IN THE PAMPHLET (Fig. 37). Fragments suggest at least two more 'Tricopherous' bottles and one more 'Davis'.

An intact pickle bottle (Fig. 23) was excavated from the top of the collapsed bell pit. Salad oil bottles are represented by Fig. 33 which is identical to an Omata example (Prickett 1981:403). Fig. 30 depicts the top of a 'Champion' vinegar bottle. Lea and Perrins Worcestershire sauce bottles are represented by a large number of fragments (of no more than one or two bottles), which include a glass stopper (Fig. 28) and embossed base (Fig. 34). Other intact aqua glass stoppers are shown in Figs. 25-27.

Glass bottle tops and necks of aqua ranging to pale blue are shown in Figs. 29, 38 (three examples), 39, 40 (a second example was slightly smaller), 41 and 42 (four examples). The bottles represented would contain a variety of products ranging from medicines and condiments to saddle oil. Other aqua bottles found at Pukearuhe include: a large hexagonal shaped bottle (Fig. 36), of which two examples were embossed on the base '1148' and '64 (O?)'; a plain round quart bottle embossed 'M' on

the base; two bases as illustrated in Fig. 32 with '2RT' and 'E.R. (?)' embossed on them (another slightly larger, took the same shape); and a flat side fragment embossed '... C EN .../ ...ERVE.../...UIT...' (Fig. 35).

Blue bottles ranged from the intense ultramarine blue of poison or medicine bottles of which one top (Fig. 43) and some fragments were found, to bottles of very pale blue. Judging from colour and general conformity it seems likely the pale blue bases illustrated in Figs. 46 and 47 belong respectively with the tops, Figs. 38 and 41. There was another, more rounded, base similar to Fig. 47. A very large bottle of 94 mm diameter is shown in Fig. 48. Colourless glass was represented by bottles as well as other items. The bottles include the 1½ oz, PIESSE/AND/LUBIN/LONDON medicine bottle with ground glass stopper (Fig. 44; a smaller stopper belongs elsewhere), and the smaller perfume (?) bottle depicted in Fig. 24 (of which there was a second top and neck). A colourless top was very similar in form to the aqua Fig. 39. Fig. 31 depicts a strongly moulded salt or pepper shaker — the DÉPOSÉ on the base indicates a French origin (déposé indicates that the design was 'registered'). A fragment embossed &/...HICO... probably contained coffee and chicory. Other colourless glass fragments came from strongly moulded containers. Several pieces of frosted lamp glass were found. Most of the window glass came from Square BII. A single round spectacle lens of apparently plain glass was found.

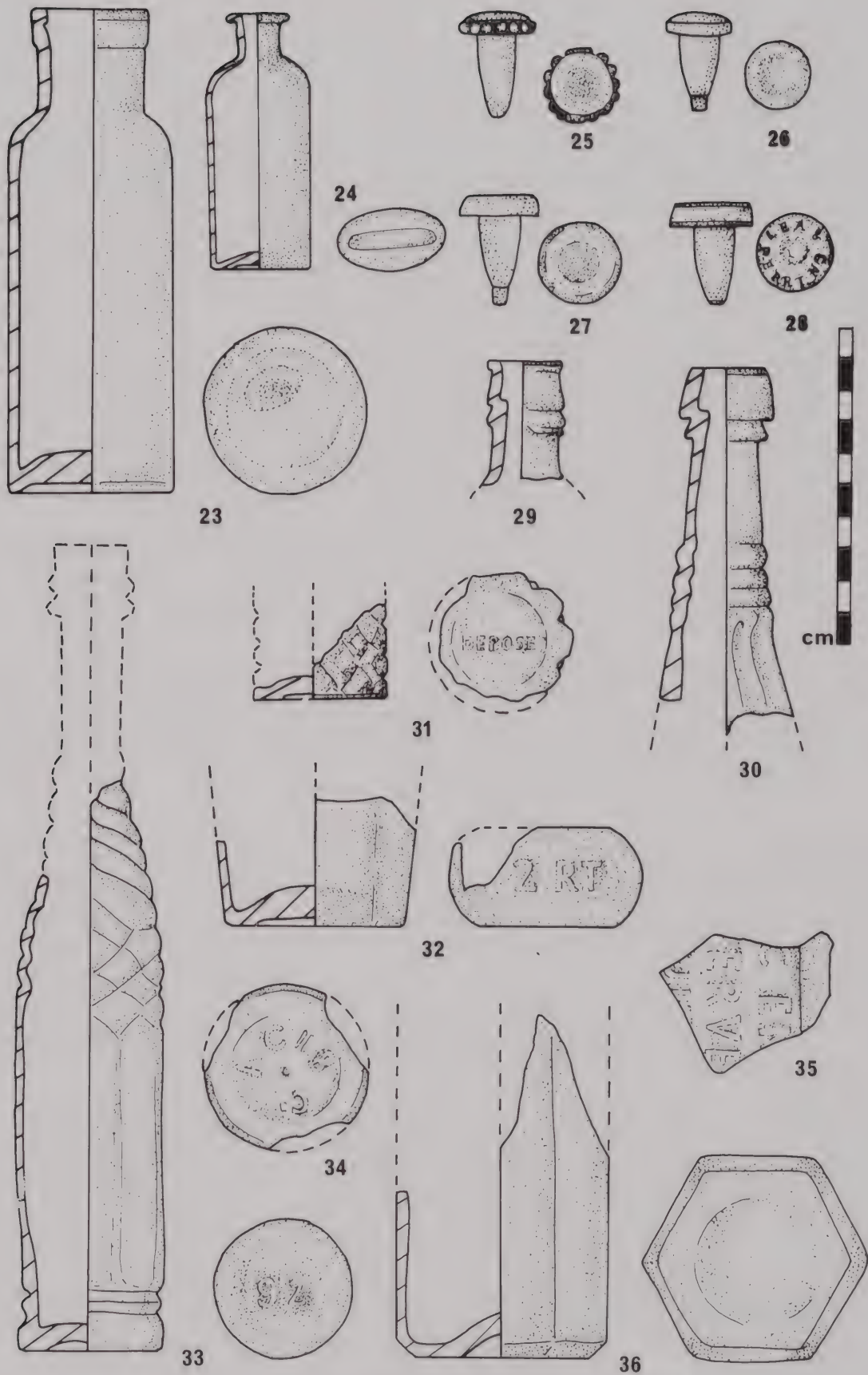
Two identical bottles in green glass, of a type known as 'skittles', were found intact in the mouth of Pit 2 (Fig. 49). Such bottles probably contained soft drink. 'Black bottle' glass (actually a very dark green), which made up 80% of bottle glass found at the Omata Stockade (Prickett 1981:388), made up only 16% of Pukearuhe material. Two 75 mm diameter bases were embossed respectively 'A/1075' and 'BS(O?)'. 'Black bottles' commonly contained beer.

Earthenware and stoneware containers. The only complete earthenware container at Pukearuhe was a 'penny ink' bottle from Square CII (the type is illustrated in Prickett 1981:419). Other items represented only by fragments were a 90 mm diameter cheese jar (which may be compared with one from the Warea Redoubt, Prickett 1981:545), an 80 mm diameter ginger beer bottle and a 200-240 mm diameter storage crock.

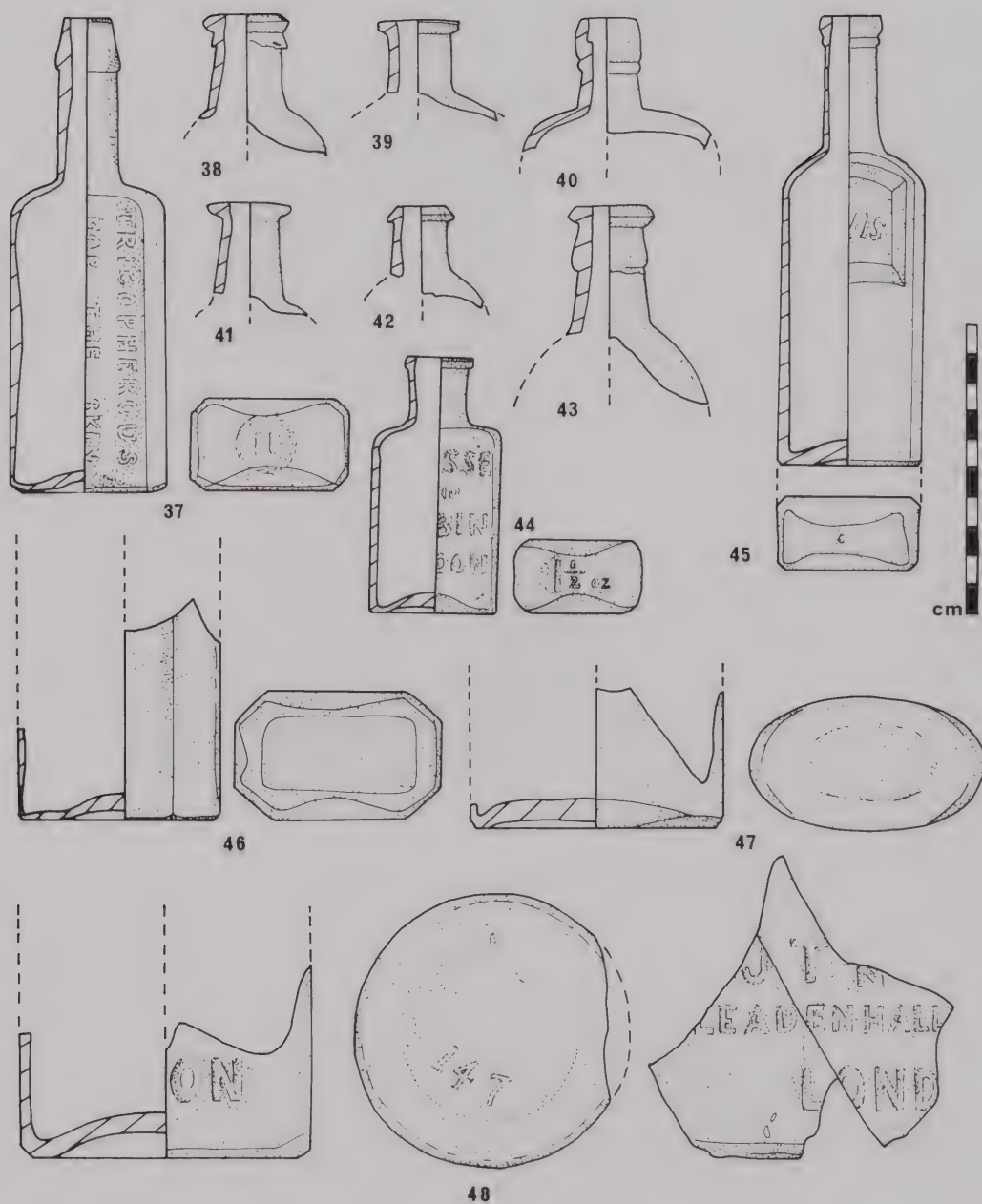
China and porcelain. A total of 2893.5 g of china and porcelain was found, mostly very fragmentary material. It represented plates, cups, serving dishes, jugs and a chamber pot. It was almost all of white glaze with transfer pattern.

A 145 mm high jug of cream glaze had a deep moulded decoration (Fig. 50). It lacked only the handle. Other jugs were represented by a brown handle and two pieces of blue and white 'Cornishware' (see Prickett 1981:433). A large piece of chamber pot was decorated with a pale violet vine pattern (Fig. 55).

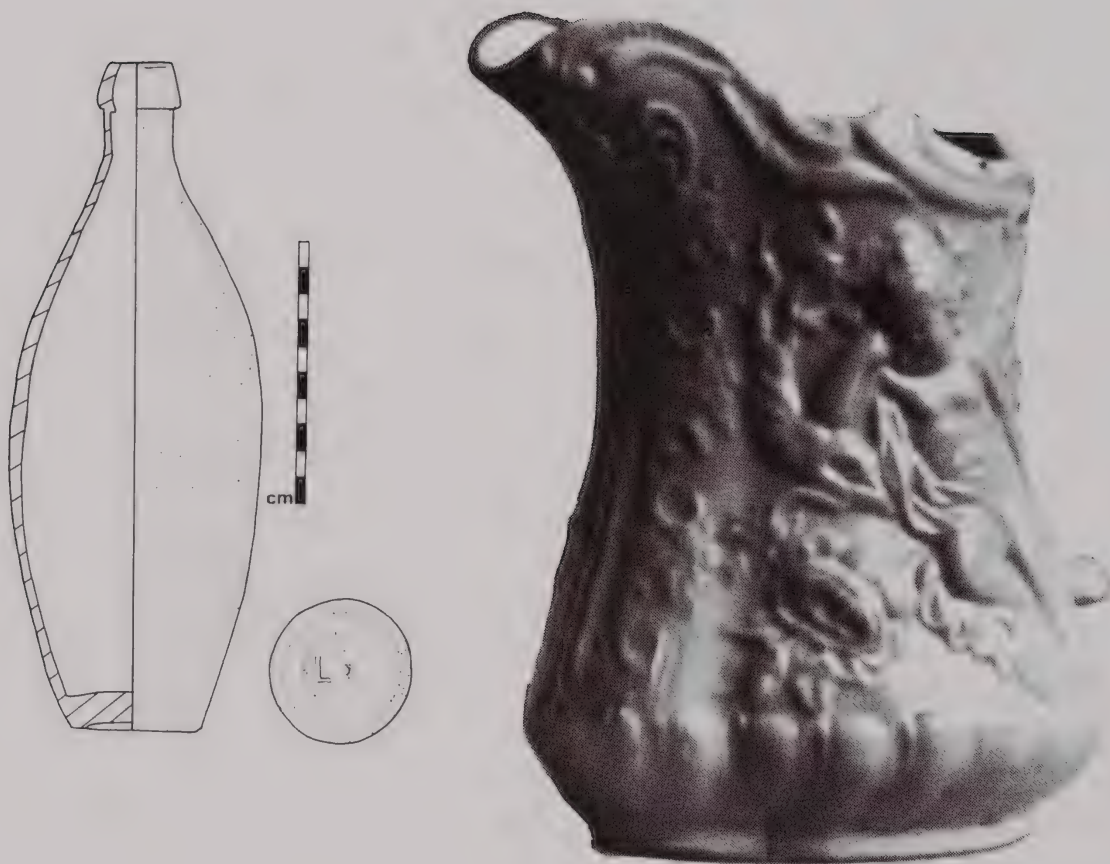
Serving dishes include a massively thick piece from a very large blue on white meat dish. A smaller vegetable dish can be substantially made up from 11 pieces into an oval shape 230 x 190 mm; it is decorated by a pale blue on white floral decoration (Fig. 51). A third serving dish may be represented by a thick base piece which has a maker's mark on the under side including a crown and wreath with the end part



Figs. 23-36. Bottles.



Figs. 37-48. Bottles.



Figs. 49,50. 49. Bottle. 50. Moulded cream glaze jug,

of a design name, '...DDESLEY' (Fig. 59). This is from a 'Teddesley' design made by Pinder, Bourne and Hope (*ca.* 1851-62) and its successor Pinder, Bourne and Company (1862-82), of Burslem, Staffordshire (Godden 1964:495), a firm taken over in 1882 by Doultons who continued to use many of the old Pinder, Bourne and Company design marks.

There were at least seven plates represented, often by extremely fragmentary material. The large green pictorial piece with complex border, shown in Fig. 52, was the best remaining piece with this border; others were in blue/grey (Fig. 56). Plates like this were 200-250 mm in diameter. Another plate, with an irregular edge, is blue on white with a complex border of flowers (Fig. 58). A 250 mm diameter plate of

blue on white border is represented by a single piece (Fig. 57). Three pieces of a blue on white child's alphabet plate were found (Fig. 53). The plate was 180 mm in diameter. Three other fragments indicate black on white plates with complex flower decoration.

Much the most abundant material comes from cups and saucers. Eleven cup and saucer sets were represented by pieces of sufficient size to determine decoration. As many again were represented by fragments. Heavy ('institutional') saucers have double red lines at the rim and near the centre, or three green lines at the rim only (Fig. 62). Another saucer fragment has a single green line near the centre. Eleven cup and saucer fragments are similarly sparingly decorated with broad and fine blue lines around the rim and another fine line around the cup interior. Nine pieces of a finer quality saucer, white with moulded floral decoration picked out in blue, were found (Fig. 61). Six pieces of a similarly fine saucer are decorated with fine gold lines and central floral decoration. Fifteen pieces of a cup and saucer set have a hand painted green rim line and a repeated hand stamped red decorative motif below (Fig. 60); twelve cup and saucer pieces are identical except for a blue rim line. Six pieces of a cup with green vine decoration and a narrow border above (the border is repeated inside) are represented in Fig. 64. Four further pieces come from a cup of very similar decoration in blue rather than green (Fig. 63). Three pieces of a cup with geometric border in black are represented in Fig. 65. Another nine fragments represent nine different cups or saucers. Most are decorated in blue on white, with one in brown body and overall brown glaze with hand painted green decoration. Fifty-nine plain white fragments of porcelain or china are from apparently undecorated cups and saucers.

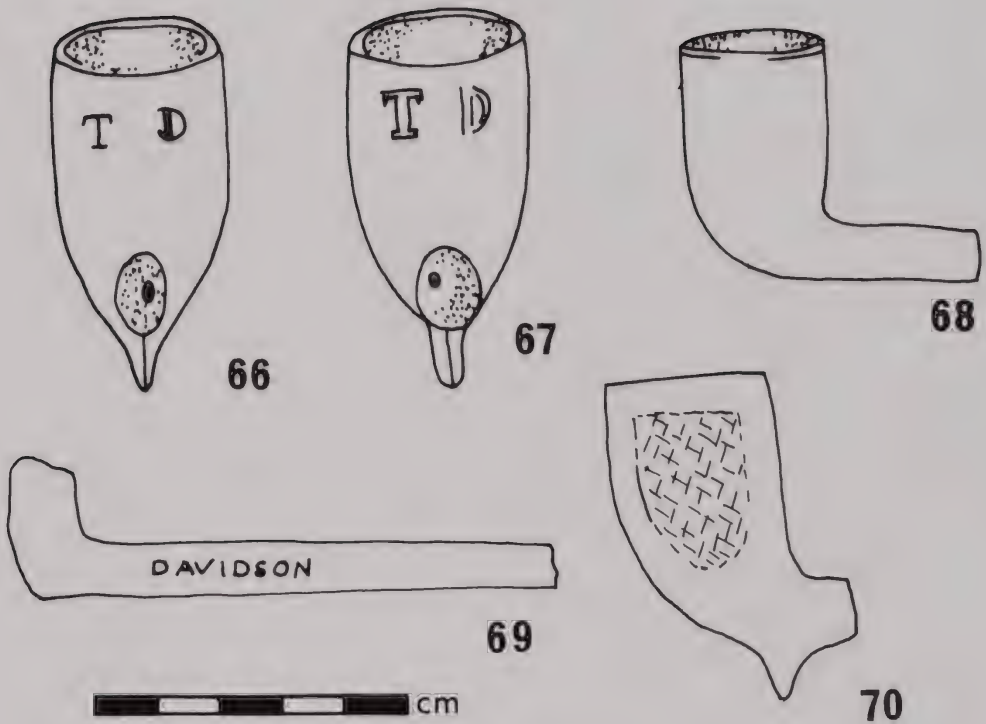
Among the porcelain are several fragments which, like the alphabet plate, proclaim the presence of children at the Pukearuhe settlement. Pieces of two porcelain dolls include a tiny head only 13 mm high and a leg (Fig. 54) and part of a face of a second, larger, doll. Other pieces come from what appears to have been a children's tea set.

Clay tobacco pipes. Five clay pipe bowls, five bowl fragments, six stem pieces and one bowl/stem piece weigh a total of 126 g. Complete bowls include two with embossed shields filled with cross-hatching on both sides — one has a spur (Fig. 70), and one unmarked bowl (Fig. 68). Two others have embossed and stamped 'TD' marks (Figs. 66 and 67). From experience at Omata and Warea (Prickett 1981) it is likely the embossed 'TD' was made by the Glasgow manufacturer Thomas Davidson & Co., while the stamped 'TD' was made either by McDougall or by William White, two more Glasgow makers. The embossed 'TD' has 'V' and 'T' embossed on the spur; the stamped 'TD' appears to be embossed '3' on the spur. There are two further fragments with stamped 'D' of TD (making a total of three of these bowls) — one of them has a splash of glaze on the rim. Three stems are marked DAVIDSON/GLASGOW (Fig. 69).

Buttons. Sixteen buttons were found. Six were of a type known as 'small chinas' probably used on underwear (Figs. 71-75; there were two of that shown in Fig. 74). Another six are brass trouser buttons (Figs. 76-78 and 81-83). The remainder include



Figs. 51-65. Range of china and porcelain found in Pukearuhe excavations.



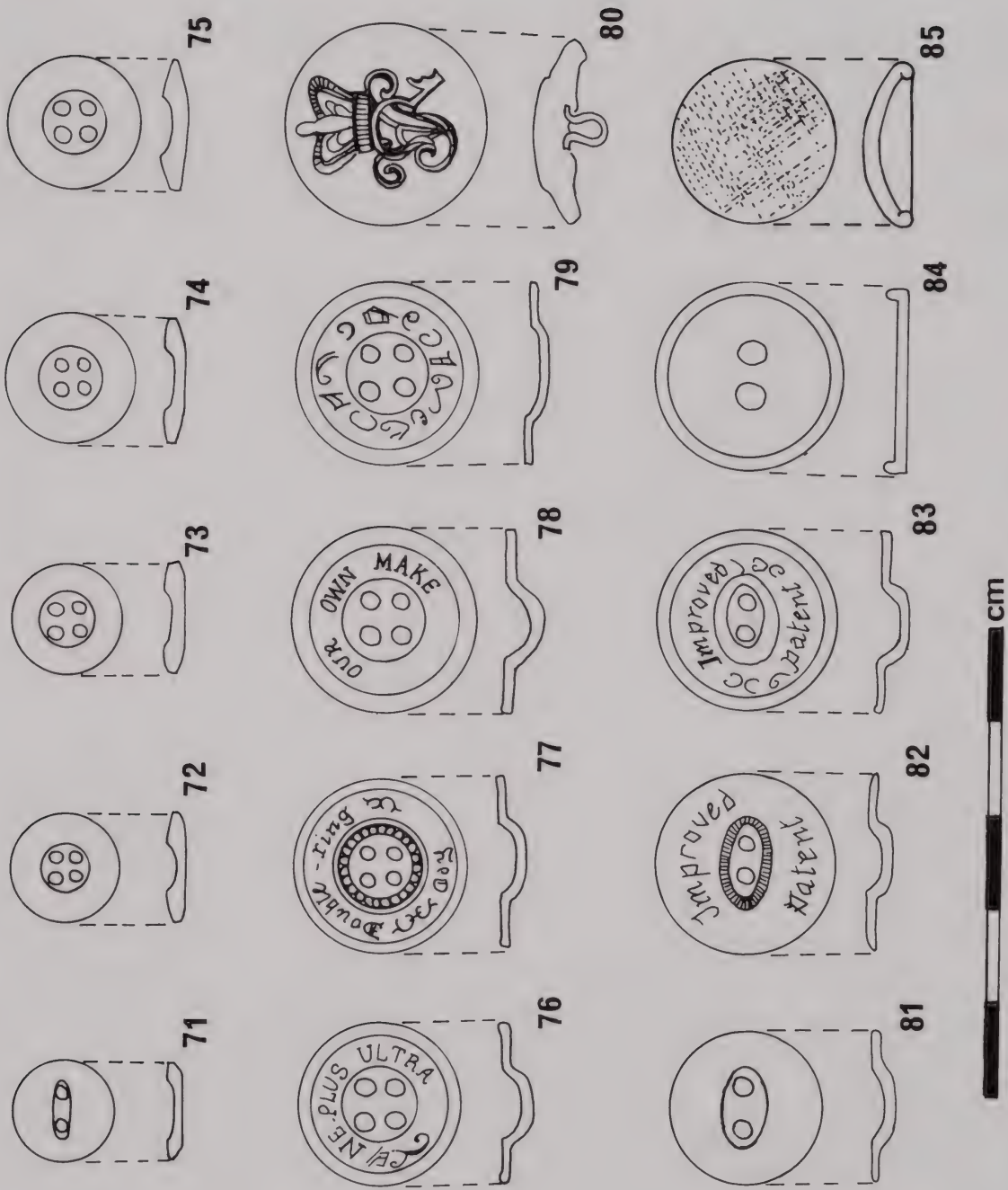
Figs. 66-70. Clay pipe pieces.

a one-piece pewter trouser button (Fig. 79); a 'VR' Sanders type $\frac{3}{4}$ inch uniform button of very similar design to buttons found at Omata and Warea (Prickett 1981:456,550) except that it lacks the encircling wreath (Fig. 80); the back only of a two-piece button in brass (Fig. 84), which is identical to a button found at Omata (Prickett 1981:456). One button of two-piece manufacture was covered in decorative cloth which survived in a very fragmentary state (Fig. 85).

Footwear. A large quantity of fragmentary pieces of boots and shoes were found in the upper fill deposit of Pit 2. Sole pieces indicate 15-20 boots or shoes are represented in the deposit. Many soles are small showing that they belonged to women and children; in one case a child of 4-5 years age may be inferred.

Where it can be established, the footwear is of the lace-up boot type. Most of the soles are heavily nailed, this being especially notable at the heels. Two iron heel plates were found.

Ammunition. Lead bullets and cartridge cases are almost all of the 'Snider' type. Five Type 5 bullets (with three cannelures) go with the Mark 8 Snider cartridge. Two Type 6 bullets (four cannelures) go with the Mark 9 Snider cartridge. Five of the bullets have clearly been fired. At least 20 cartridges give the total Snider ammunition represented. One 12-bore shot gun cartridge was found.



Figs. 71-85. Buttons.

Miscellaneous iron. Highly oxidised iron, often covered in sand, was the most abundant European artefactual material. In total it came to *ca.* 6 kg. Much of this weight was made of unidentifiable fragments of nails, wire, flat iron ('tin') etc. Most was found in the collapsed mouth of Pit 2.

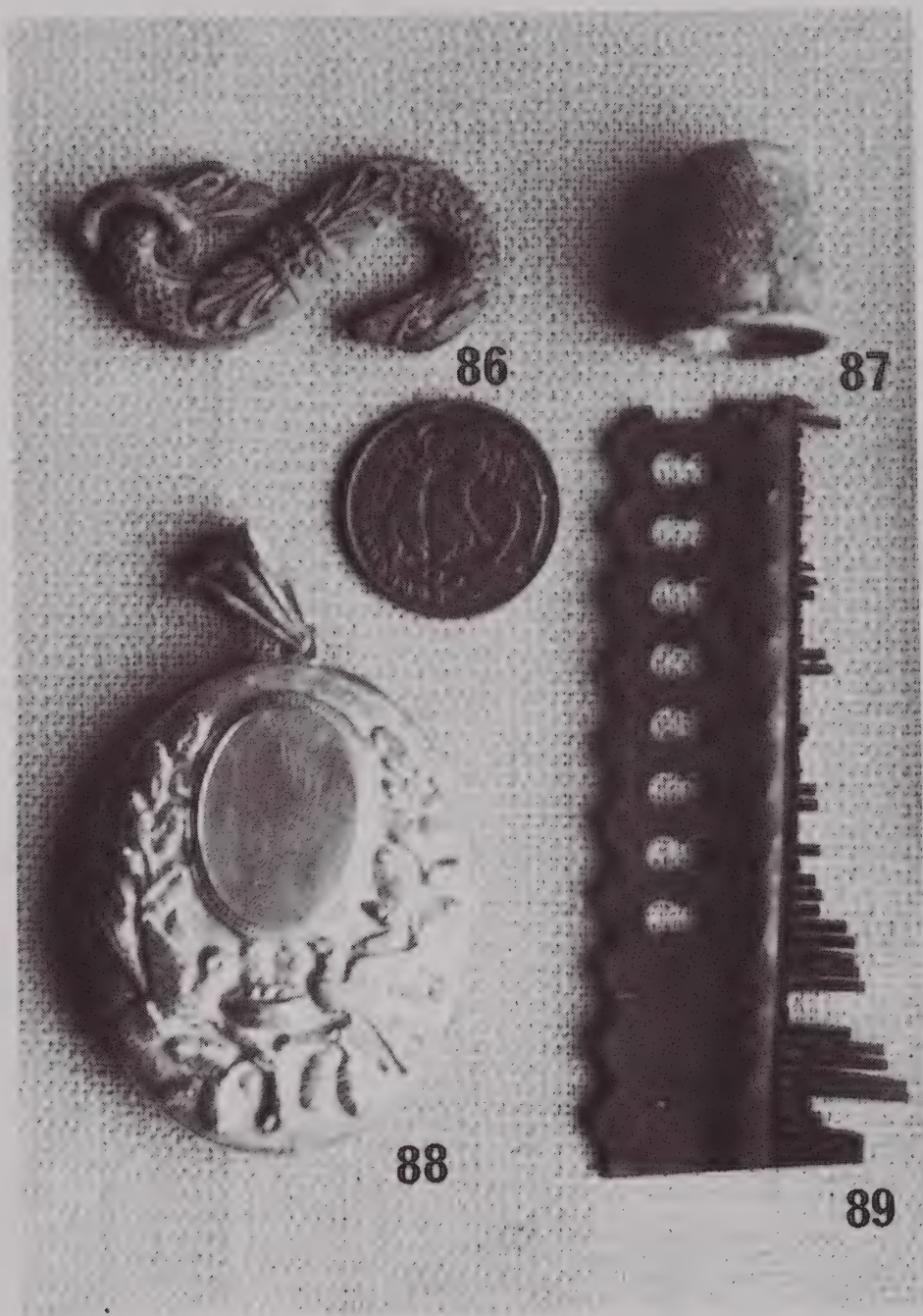
Among iron containers were four matchboxes of the standard *ca.* 7 x 4 cm size, one of which was marked BRYANT & MAY/WAX VESTAS/LONDON. This box is apparently identical to that illustrated by Anson (1983:Fig. 7 No 19) from his Central Otago collection. Cylindrical 'tin' can material which was more than hopelessly fragmentary was 80 mm and 180 mm in diameter. A large rectangular 'tin' can, perhaps of 'kerosene tin' size, was found in the disturbance at the north baulk of Sq. AI. Other domestic material included part of a sharpening steel and a table spoon.

A large quantity of iron material was of building use. Most fragments were probably pieces of nails. Complete nails mostly fell into the size ranges *ca.* 60, 80 and 120 mm; they included wire and cut nails. A 260 mm bridge spike and another 'cut' nail 150 mm long represented the larger end of the size range. Two gate hinges and one gudgeon pin were found, as was one door hinge and a latch type of door handle with plate. Chain fragments included one with a 55 mm diameter ring at one end, presumably part of some harness gear. Parts of four horseshoes were found. A sickle blade, large staple, 220 mm diameter barrel iron, and small rotary handle with wooden hand piece (such as might be used in a coffee grinder) completed the iron material found at the site.

Miscellaneous copper and brass. Among copper and brass items were thimbles (Fig. 87; representing two found at the site) and a belt catch (Fig. 86). A fragmentary buckle was found which, with its two 'points', was probably used on canvas webbing. The only coin recovered was an 1866 penny. A bath or sink plug, two copper rivets, part of an umbrella, and what may be two parts of a door handle are among other copper and brass material. Other items are too fragmentary for identification.

Other domestic items. Domestic items not covered elsewhere include a wide range of material. A bone toothbrush handle and part of a tortoise shell ladies comb (Fig. 89) may be grouped with the chamber pot as belonging to personal toilet items. Part of a mouth organ was very similar to a piece found at the Omata Stockade (Prickett 1981:478) A pewter (or lead alloy) handle may be from a teapot or mug. A sterling silver locket was found with the mass of other European material in Square CI (Fig. 88).

Children's items which can be linked with the porcelain dolls and alphabet plate include: three glass marbles and a small (35 x 16.5 x 8.5 mm) earthenware play brick. Other material which might be linked to the presence of children at Pukearuhe are fragments of writing slates and slate pencils (which included one complete at 140 mm length).



Figs. 86-89. Miscellaneous items: 86. Belt buckle. 87. Thimble. 88. Sterling silver locket.
89. Remains of comb.

Miscellaneous. Miscellaneous finds at Pukearuhe fall into several general categories. Building material included timber and brick. Sawn and mortised timber was found in the Sq. CI deposit, other large unworked pieces were recovered from the fill of Pit 1. Considerable fragmentary brick was found, again in Square CI. A retained example is of a crudely made brick *ca.* 103 mm wide and 61 mm deep. Fragmentary lead sheeting totalled 241 g; some of it is still backed by cloth which suggests a packing use rather than roofing or plumbing.

A total of 3.1 kg of bone was made up almost entirely of butchered beef bone. Amongst it were a number of teeth. A number of shells were found in the site, including two *Alcithoe sp.*, one *Turbo smaragdus?*, and a rock oyster; more than ten small *tuatua* were retained in a charcoal sample which may have derived from a Maori oven scoop. Two small peach stones were found, as were *ca.* 15 fragmentary pumpkin or squash seeds (similar to those of the modern 'crown' pumpkin variety).

DISCUSSION AND CONCLUSIONS

The geographical location and superb situation for successive fortifications at Pukearuhe has already been outlined. The site offered both Maori and Pakeha a powerful natural advantage against incursions from the north over a period of several hundred years. The rugged inland ranges made the direct beach route beneath Parininihi the natural gateway into the north Taranaki region. Thus, geography imposed a strong historical continuity on the site, located above the beach at the point of access to the northernmost extension of Taranaki's fertile lowland.

Pukearuhe was a large and important pa. The total defended area of the three major platforms, the intervening defensive ditches and the terraces down the west side is *ca.* 10,000 m². The history of the various parts of the pa is, however, now probably beyond recovery, so that we will not know how the occupied area of the fortification expanded and contracted through the centuries.

In his field notes Gorbey argues for two phases of Maori occupation of the terrace, the first represented at the outer part of the terrace by the compacted grey sandy soil and the second by the overlying clay floor. Such was the subsequent disturbance, however, that the status of these two 'occupations' is difficult to establish. It is probably safest to conclude no more than that Maori construction and occupation of the terrace took place over one period of time, whether or not this resulted in two distinct occupation floors.

Traditional information concerning occupation of Pukearuhe at least as early as the opening of the eighteenth century has been mentioned above, in the section on the history of the place. As a result of the excavation, charcoal samples were submitted to the Institute of Nuclear Sciences, D.S.I.R., for analysis. The results were as follows (in terms of new half life corrected for secular effects). Descriptions follow Gorbey's field notes.

Sample 1, Laboratory Number NZ 2645. 165 ± 54 B.P. Square BI, Layer 3a, depth 62 cm. Sample collected from a scoop hearth in the uppermost floor layer (see Fig. 8). The hearth contained much ash; the charcoal was chunky.

Sample 2, Laboratory Number NZ 2646. 346 ± 54 B.P. Square BI, Layer 3a, depth 59 cm. Sample collected from scoop hearth (see Fig. 8), again in clear association with Layer 3a. Small pieces of charcoal were scattered over the floor of the shallow hearth.

Sample 3, Laboratory Number NZ 2647. 369 ± 54 B.P. Square BI, layer on top of natural soil — the old slope line under the terrace (see Fig. 7), depth 125-140 cm. "Whereas the other two samples are associated with the occupation of the terrace, this should date the beginning of the construction activity. The sample was collected from a thin but concentrated scatter of very small pieces of charcoal that almost certainly represent the burning of the fern and scrub prior to the building of the terrace."

It will be seen that Samples 1 and 2, which date the same stratigraphical event, are very far apart in terms of radiocarbon age. Sample 2, on the other hand, gave a result close to Sample 3. Problems with the use of charcoal make it likely that all three radiocarbon ages are somewhat older than the actual age of the dated events (thus it is not impossible that Sample 1 is from charcoal of the European occupation). The close conformity of Samples 2 and 3 make it likely that they both date a virtually simultaneous event, the preparation and initial occupation of the terrace. The radiocarbon analysis puts this at about the beginning of the seventeenth century. Given the problems of charcoal use in radiocarbon dating, however, it may be dangerous to use this evidence to argue strongly for an earlier occupation of Pukearuhe than that suggested by available traditional history, early in the eighteenth century.

The small assemblage of Maori artefacts includes nothing outstanding in a Taranaki context. The well-finished but nondescript green andesite adze is highly characteristic of late occupation sites in Taranaki. The bowenite chisel and other adze pieces may also be argued to be late in the Maori sequence. Less easy to explain is the number of hammerstones found in the excavation. These were clearly used for working with stone, yet neither the artefacts under manufacture nor the waste flake debris one might expect are to be found among the recovered material.

European material found at Pukearuhe has similarities with that found at other nineteenth century military sites in Taranaki. At the Omata Stockade, Warea Redoubt (both reported in Prickett 1981) and Pukearuhe are to be found the remains of men under arms at a frontier post of European expansion in New Zealand. Thus ammunition and military buttons are of a directly military nature, while bottle and other glass, china, clay tobacco pipes, boots, musical instruments, tin cans, matchboxes and other iron, building materials and other items are all represented in the various military sites excavated in Taranaki. Like the directly military items this material is all part of the debris left by men serving in an isolated part of an isolated country. All, or almost all, manufactured items were imported from elsewhere in the world, probably from the northern hemisphere. The difficulties of transport would force the Pukearuhe communities in the years 1865-69 and 1872-85 to rely heavily on their

own resources where possible. Thus the beef bones are representative of locally slaughtered cattle and other animals. As well, milk and other dairy products, vegetables, fruit, eggs and other food would certainly have been provided locally.

Where the Pukearuhe assemblage of European material differs from that of the other two Taranaki sites is in the women and childrens' items found. Thus the locket, combs, two thimbles and some footwear indicate women, while the dolls, alphabet plate, toy building brick and marbles indicate children. It is possible this relates to the unfortunate Gascoigne family of the earlier occupation period, although their house was situated some 100 m away on the central platform of the site. More likely it dates from the Armed Constabulary period when a large community, which included a number of families, lived at Pukearuhe.

In its European occupation, therefore, Pukearuhe represents a late phase of European military expansion in Taranaki. The presence of women and children show that the frontier had lost at least some of its dangers. Women and children were rarely present in the campaigning fortifications of the 1860s. And Pukearuhe itself shows that when they were present, the confidence that had them living at such a post was badly misplaced.

The 1968 excavation at Pukearuhe was an early excavation of a type that has since become common in New Zealand. Salvage excavation is undertaken when a site with some potential in terms of information about the past is threatened by a specific development programme. It is doubtful if Pukearuhe would have been excavated had it not been threatened. The Maori fortification was already badly damaged by twenty years of intensive European occupation, which had itself suffered greatly under the plough. The difficulties that this caused were very apparent during the excavation. Pukearuhe has, however, provided additional data on both Maori and Pakeha occupation in Taranaki, for which well provenanced material is rare enough. As a salvage project, however, its value is doubtful: just prior to construction, the Kapuni Gas Line was shifted northward a few metres to entirely avoid the excavated parts of the site.

Acknowledgements. The authors would like in particular to thank Ken Gorbey for his excellent field records and generous assistance in the writing of this report. Thanks are also due to the Taranaki Museum which made the material available for study, to Kathy Prickett who identified the stone material, Dave Reynolds who tracked down the 'Teddesley' trade mark and Wynne Spring-Rice for assistance with the ammunition.

REFERENCES

- ANSON, D.
 1983 Typology and seriation of wax vesta tin matchboxes from Central Otago: a new method of dating historic sites in New Zealand. *N.Z.J.Archaeol.* 5:115-138.
- BUIST, A. G.
 1964 Archaeology in North Taranaki, New Zealand. *N.Z.Archaeol.Ass.Monogr.* 3:1-102.

BROOKES, E. S.

1892 *Frontier Life: Taranaki, New Zealand*. Auckland, H. Brett. 203p.

COWAN, J.

1922-23 *The New Zealand Wars* (2 vols.) Wellington, Government Printer.

GODDEN, G. A.

1964 *Encyclopaedia of British Pottery and Porcelain Marks*. London, Herbert Jenkins. 765p.

GORBEY, K.

1969 The Kapuni pipeline salvage archaeology survey. *N.Z.Archaeol.Ass.Newsl.* 12:218-223.

MS.a The Kapuni Pipeline Salvage Archaeology Project. Report to the N.Z. Historic Places Trust (1968), 3p.

MS.b Report on N91/3 and N91/4. Report to the N.Z. Historic Places Trust (1968), 4p.

McFADGEN, B. G.

1970a The salvage excavation of a pa at Mokau, north Taranaki, New Zealand. *N.Z.Archaeol.Ass.Newsl.* 13:64-75.

1970b The archaeological survey of the Kapuni pipeline. *N.Z.Archaeol.Ass.Newsl.* 13:113-119.

PRICKETT, N. J.

1981 The Archaeology of a Military Frontier: Taranaki, New Zealand, 1860-1881. Unpublished Ph.D. thesis, University of Auckland.

1983 Waitotara ki Parininihi: aspects of the archaeology of the Taranaki region. A Lot of Spadework to be Done, *N.Z.Archaeol.Ass.Monogr.* 14:281-329.

SMITH, S. P.

1910 *History and Traditions of the Maoris of the West Coast North Island of New Zealand prior to 1840*. Memoirs of the Polynesian Society, Vol. 1. New Plymouth, Thomas Avery. 562p.

OBSERVATIONS ON A TONGAN NOSE-FLUTE (FANGUFANGU)

'OKUSITINO MAHINA

UNIVERSITY OF AUCKLAND

Abstract. An inscribed nose-flute from Tonga is analysed for its cultural content by translating the text written on the flute and attempting to interpret the drawings. Provenance and cultural context are confirmed by contemporary ethnographic evidence.

This short paper is an attempt to offer an interpretation of some cultural features associated with a Tongan bamboo nose-flute (*fangufangu*) in the collections of the Auckland Museum. The nose-flute originates from the island of Vava'u (Fig 1.), one of the northerly group of islands in the Kingdom of Tonga.

In all probability, this nose-flute, made before 1878, originally came from the westernmost part of 'Uta Vava'u or mainland Vava'u as suggested by the written text on the flute. It tells a story about the types of fishing (*toutai*) usually practised in the only lake in Vava'u but also carried out in the adjoining bay or sea in the same district (Fig. 1). It depicts the varieties of fish plentiful both in the lake and in the adjoining sea. Such fishing was a subsistence activity, or more appropriately, a social and economic enterprise. It is implicit in the text that there existed a particular skill (*poto*) and specific knowledge (*'ilo*) acquired by people in this activity, and that this was learned as people interacted with their environment and with others.

The nose-flute is made of bamboo sawn off at the joints (Fig. 2). The overall length is 31 cm while the inner or hollow part only is 29.5 cm. The diameter of one end of the flute is 3 cm while the diameter of the other end is 3.5 cm. The outer diameter of the drilled holes averages 1.25 cm and the inner diameter, 1 cm. Intervals between each of the five holes drilled in a line on one side of the segment average 6.5 cm (Fig. 3). The middle or centre hole continues right through to the other side of the bamboo. These are the holes that produce the *fangufangu* musical scales. The distance between the five holes should be equally spaced to produce a high quality of sound. Hence, a range of practical skills are required for the production of nose-flutes that produce sound with the best musical effect.

I shall now look at the hot-poker-work, both writing and drawing, inscribed on the flute. The following is a direct copy of the writing as it appears on the bamboo segment:



Fig. 1. Map of Vava'u, Tonga, showing the lake at the western end.

“KOBATIMIENAOKUTUUIHE KOTUNA
T AUMUAMUAOBOBAOKOEAMA
TUNAKOETAOENAKUOTUUIHE
IKAKOEIKAIHEANOVAIVAVA KOEBOKOFU
KOAKOE
 KOEFAT”

The following text in modern Tongan is inferred from the original one, with additions (in brackets) to complete it. This transcription, which accompanies the catalogue entry, was written by Latu Jone c. 1898. An English translation is given underneath.

“Ko Patimi ‘ena ‘oku tu’u ‘i he taumu’a ‘o (3) popao ko (‘ene)
There is Patimi who is standing at the bow of the canoe night-fishing

ama tuna (.) Ko e tao ‘ena ‘oku(kuo) tu’u ‘i he ika (.) Ko e ika
eel. The spear has hit the fish. They are the fish

‘o e anovai (‘i) Vava(u’) (.) Ko e ... (pokofu, tuna, mo e fai.)”
in the lake in Vava’u. They are pokofu, tuna, and fai.

Latu Jone (Latu Sione).

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 2. Tongan nose flute (No. 11677) received in Auckland Museum in 1878 as a gift from Mr Parsons. Upper side shown with drawing, lower side with the text.

Photo: University of Auckland

It appears that the original text is complete for this is explicit in the attempted Tongan transcription. The complete translation tells of a man named Patimi, who was probably an expert fisherman in one of the adjoining villages. The fishing, which was night fishing of eel (*ama tuna*), was done in a canoe (*popao*). The text tells how Patimi used the spear (*tao*), for fishing. Patimi died in 1943 aged over 100 years according to a note made by Dr. T. D. C. Childs in the Museum catalogue.

It seems that the discontinuity in the text itself, especially the writing, was for the artist, Latu Sione, a problem of space. This is best illustrated towards the last part of the text, namely, 'VAVA...KOA...KOE'. The word VAVA, in all probability stands for Vava'u, was left incomplete because space was limited by the burning flame (*ulo*) of the torch (*fo'iamā*). The names of the varieties of fish could not therefore be made to follow immediately after the word, KOE (Ko e), for example, *Ko e pokofu, tuna, mo e fai*. This problem of space has led the artist to actually place the corresponding names under each fish, in spaces available. It is interesting to note how the problem of space has led to actually resolving the problem of identification, that is, each fish can now be easily recognised because the artist had assigned them their respective names.

It follows that there was a discontinuity in writing and a continuity in drawing in terms of the artistic expression found in the text. Drawing was probably more convincing to the artist as a form of expression than was writing. In terms of the intensity of the artistic expression, the artist was prepared to sacrifice writing for drawing.

The analysis must not be done in isolation from a relevant social setting. It is therefore implicit that the flute text must reflect some social, economic, and cultural aspects of the three adjoining villages Tu'anuku, Longomapu, and Nga'akau (now Tefisi) surrounding the lake and beside the sea. Two considerations are made here. One, that *pokofu* (kind of a fish), *tuna* (eel) and *mohi* (lobster-like sea animal) have always been plentiful and are still in great abundance in the lake. *Fai* (skate, ray), of which two were also engraved on the flute are not now found in the lake. *Fai* are plentiful in that dead part of the sea which is bay-like in nature facing but very

close to Nga'akau. In this part of the sea, there are two tide pools (*fo'i loto*) named Kelepulu and Tavalau which are both surrounded by thick mangroves (*tongo*). These are the common breeding grounds for fish including *fai* and it is very likely that this adjoining sea has always been frequented by the fishermen of these adjoining villages.

According to informants, *ama tuna* (eel fishing) was men's work whereas *tau pokofu* (*pokofu* line fishing) was women's work. The former was done at night and the latter in day-time. It is said that *pokofu* were fished by young women in the day, largely as a leisure activity, that is, it performed less an economic than a social function. While fishing, the young women (*finemui*) in the group had their daily wash and bath.

Another significant social feature worth discussing here is the seating order on the canoe figured on the flute (Fig. 2). This reflects certain skills and specific knowledge developed in relation to people's actual interaction with their environment and with other people in society. For example, at the rear (*taumui* or *taumuli*) of the canoe is the steersman (*taha 'alomui*), in front is the paddler (*taha 'alomu'a*), next the direction giver (*taha taulama*) who is probably an expert in locating schools of fish and fishing spots, but if not this specialist, then, it could have been a casual visitor or observer, a learner or even a fish killer and collector. Finally in the bow is the experienced spearman (*taha ama*).

In fact, there is no hardfast order of seating but that described here is the usual seating arrangement in most situations of the kind of night fishing (*ama vaka*) that is carried out in a canoe. The smallest number of people who can adequately perform this kind of night fishing are two persons, who would in this case be the steersman and the spearman. More people can participate in this particular kind of *ama* depending on circumstances such as the size of the canoe and availability and willingness of the parties involved.

The positions of steersman and spearman are usually filled by old men. Such persons only are considered to have gained sufficient skills and knowledge in the protracted time they have spent in the world, and in their interaction with their environment and people. Such senior persons are believed to have command of the skills and knowledge relating to particular enterprises in society. Thus, seniority and authority as significant aspects of Tongan society are reflected in this socio-economic enterprise.

The head-wrapping shown to have been worn by the steersman and the spearman is variously called *ao*, an archaic word meaning hat, or *pulou* or *fa'ufa'u*. Head wrapping goes with the belief, that was and is still popularly held, that if the head is properly wrapped up in barkcloth, cloth or hat, then one is able to avoid becoming ill from the cold night or becoming over-heated during the day's work. It is the old people who seriously take this precaution, and this is the case with the steersman and the spearman who are supposed to be old people themselves. In fact, today, younger men rarely take this precaution.

Acknowledgement. Mr D. R. Simmons, Auckland Institute and Museum, has made the nose-flute available and has assisted with the manuscript.

KITES AND WINDBLOWN TOYS FROM TIKOPIA, A POLYNESIAN OUTLIER IN THE SOLOMON ISLANDS

MICK PENDERGRAST

AUCKLAND INSTITUTE AND MUSEUM

Abstract. Description and directions for the making of children's toys from Tikopia, a Polynesian outlier in the Solomon Islands.

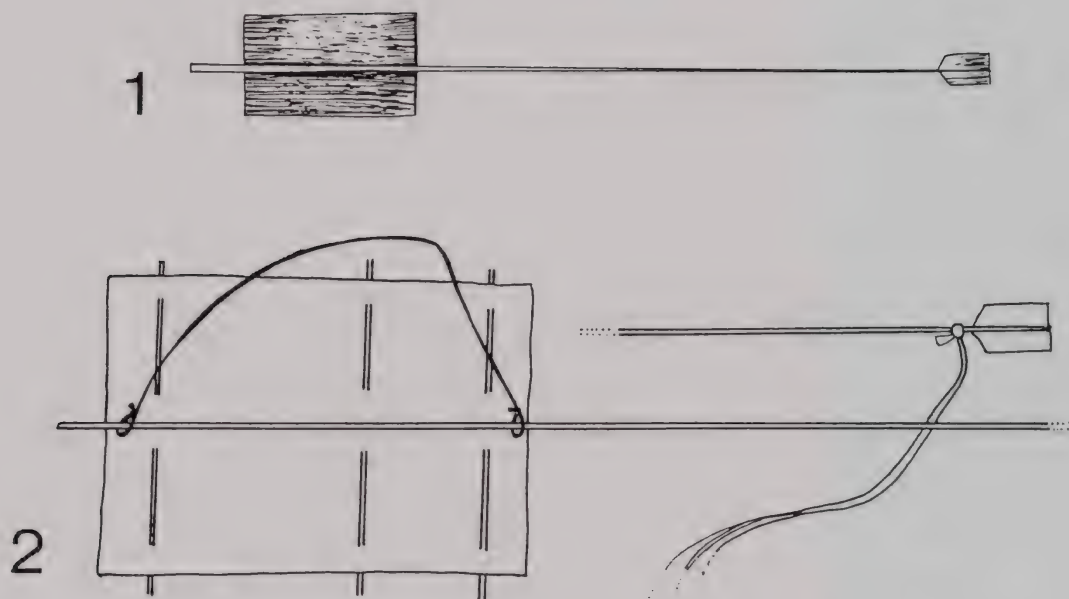
The tiny island of Tikopia is politically part of the Solomon Islands but culturally Polynesian. It lies at 168° 50'E and 12° 10'S to the east of the Santa Cruz group and to the north of the Banks Islands in Vanuatu. From June until August each year, almost continuous tradewinds blow from the east. The weather is cool, the mosquitoes have disappeared and children can enjoy playing with toys that are moved by the wind.

For six years spread over 1973 to 1980 I worked on Tikopia as a volunteer teacher for the New Zealand Volunteer Service Abroad and was able to observe, among many other things, the making and flying of traditional kites and other windblown toys. No games are associated with the toys other than seeing how high a kite will fly or how fast a model canoe will travel.

Manu rau (kites)

Tikopian children make and fly two kinds of kite. Both are known as *manu rau* and are made from leaflets of the sago palm (*te ota*, *Metroxylon* sp.) which provides a very suitable material, being both light and strong.

The smaller and more easily made of the two kinds is constructed from a single dried sago leaflet found on the ground beneath the trees. The midrib (*ngausala*) is left intact, and the leaf surface stripped away except for a rectangular section approximately 20 x 14 cm close to the thicker end. A very small section is also left at the thinner top of the midrib (Fig. 1). Next three lengths of *sina*, the thin brittle sticks obtained from the inside of the butt of a decaying sago leaf midrib, are threaded across the rectangle of remaining leaf area to hold it flat and firm. A string, usually a strip of *karava niu* stripped from the upper surface of the midrib of a coconut leaf, is attached to each end of the rectangle, allowing some slack. Lifting the leaf surface away from the midrib for a short distance creates an opening into which the string can be slipped and so held in place. To this string the flying cord, also frequently of *karava niu*, will be attached. A tail is tied to the narrow end of the sago midrib to act as a balance. It may consist of a strip of bast fibre called *kari vakai*, or a length of a creeping grass called *mauku* (*Thurea involuta*) which grows on the sand above high water mark. The small section at the tip of the midrib prevents the tail from falling off (Fig. 2).



Figs. 1, 2. The smaller type of *manu rau* or Tikopian kite. 1. The sago leaflet with sections of leaf surface removed to form the basic shape of the kite. 2. Detail, showing the thin sticks sown through to hold the leaflet flat, and the method of attaching the flying cord and 'tail'.

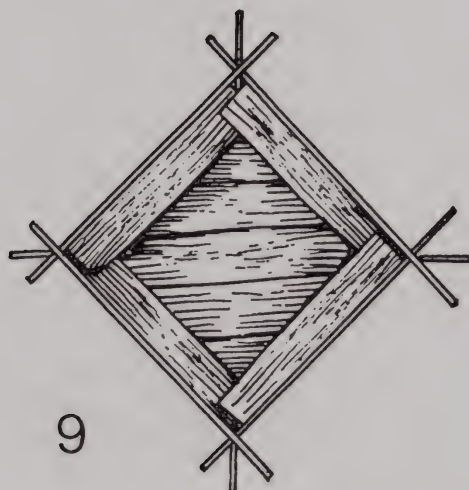
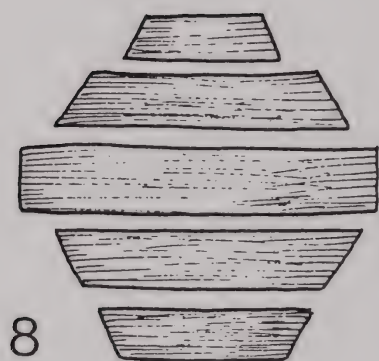
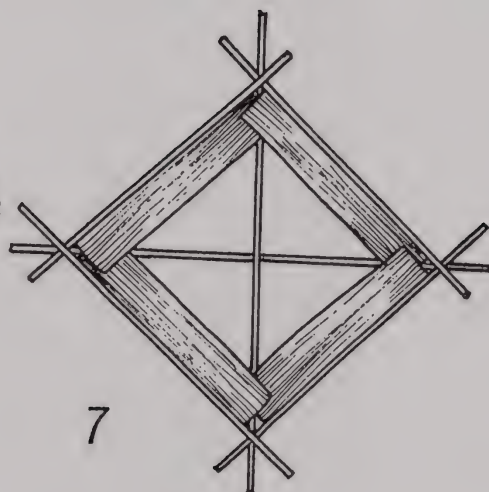
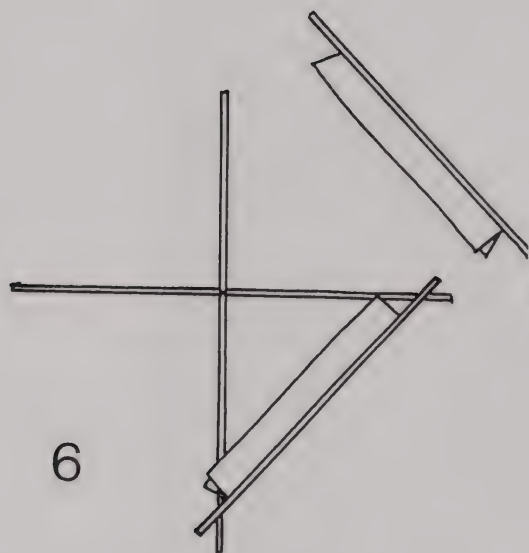
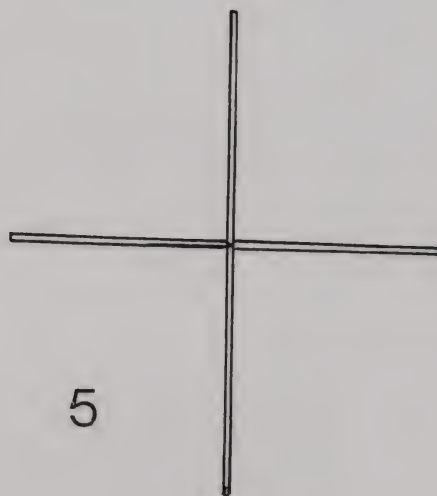
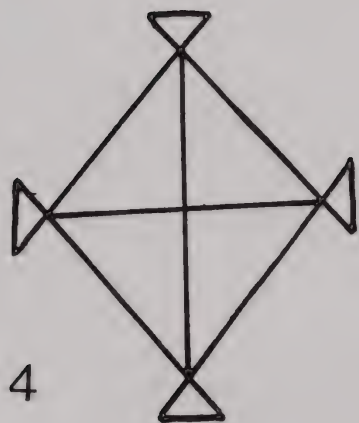
The other type of *manu rau* is larger and rather more complex. It is believed to have been introduced by men from Rotuma Island which lies to the east of Tikopia. The diamond-shaped tattoo motif (Fig. 4) frequently seen on the front of the shoulders of mature Tikopian men (Fig. 3) is said to represent this kite. The pattern is called *manu fakarotuma* (Rotuma style kite). A number of dried sago leaflets are gathered from beneath the sago trees. The midribs taken from two of these and measuring c. 96 cm and 68 cm are tied together at right angles to form a cross which is called *te fakamakeke o te manu* (Fig. 5). Four leaflets are now selected and folded along their centres and cut to the shape shown in Fig. 6 to fit around the edges of the kite. These are *te kaokao o te manu* (the ribs of the kite). The midribs, being left longer, protrude about 6 cm at each corner. They are tied into place on the cross and the corners pinned down (*e ti te kaokao o te manu*) by skewering them together with a short length of *sina* where they overlap (Figs. 7, 9, 10). The centre (*rotonu manu*) is now filled in with 9 cm wide strips of leaf with the midribs removed, cut into the appropriate shapes as shown in Fig. 8. These strips are tucked into place inside the double layers already forming the outline and making a neat finish (Fig. 9).

All the strips of leaflet are pinned together (*e ti te rotonu o te manu*) as required, with short lengths of *sina*. To do this a length of *sina* is sewn through the layers of leaflet where necessary and then the unused section of *sina* is snapped off to be used again for the next pinning (Figs. 10, 11). When the whole surface of the kite has been filled in and pinned into place, two more lengths of midrib are secured as a cross on the front surface. There is now a sago midrib cross on each surface. Small holes are made through the centre to allow the two crosses to be tied together to make

it more secure (Fig. 12). A length of *karava* (from the upper surface of a coconut leaf midrib) is tied to the top and bottom corners of the kite leaving some slack and the flying string, usually made from some strips of *karava* knotted together, is secured to this. At the lower corner a long length of *mauku* is attached. If additional weight is required, extra lengths are twisted in to make it longer. Sometimes a complete dried banana leaf is used instead.



Fig. 3. Pu Tevaea, an elder of the Tafua Clan wears the full traditional Tikopian male tattoo. In front of each shoulder can be seen the motif representing the *manu fakarotuma* (the Rotuma style kite).



Figs. 4-9. 4. The tattoo pattern, *manu fakarotuma*, which represents the kite from Rotuma. 5-9. Stages in the manufacture of the larger kite or *manu rau*.

For cultural reasons, these images have been removed.
Please contact Auckland Museum for more information.

10

11

12

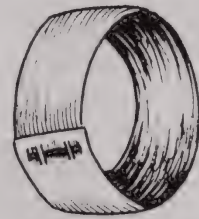
Figs. 10-12. The larger type of *manu rau* (kite) made from sago leaflets and leaflet midribs.
10,11. Fred Maseu sews the sago leaf strips in place to close the centre of the kite. 12.
The completed kite.

Manu fakarerere (leaf hoop)

Manu fakarerere is a simple leaf hoop which causes great merriment among the smaller children, as driven by the wind, it races along the hard packed sand at low tide. It is normally made from a strip taken from a green leaflet of a sago palm, although coconut leaflet may be used. For a typical example a section of leaflet 19 cm long and 2 cm wide is torn or cut from the leaflet (Fig. 13), rolled into a circle and pinned in position (*e ti te manu fakarerere*) with a short length of *sina*. With 1 cm or so of overlap at the join, the resulting hoop is 5 cm in diameter (Fig. 14). The name *manu fakarerere* was used among the school children at Safoa but Pa Rangifuri, heir to the chiefly title of the Tafua clan, gave the alternative name of *manu fakavikavika*. Similar toys are widespread in Oceania and a Cook Islands version is given for Aitutaki Island by Te Rangihiroa (1927:319).



13

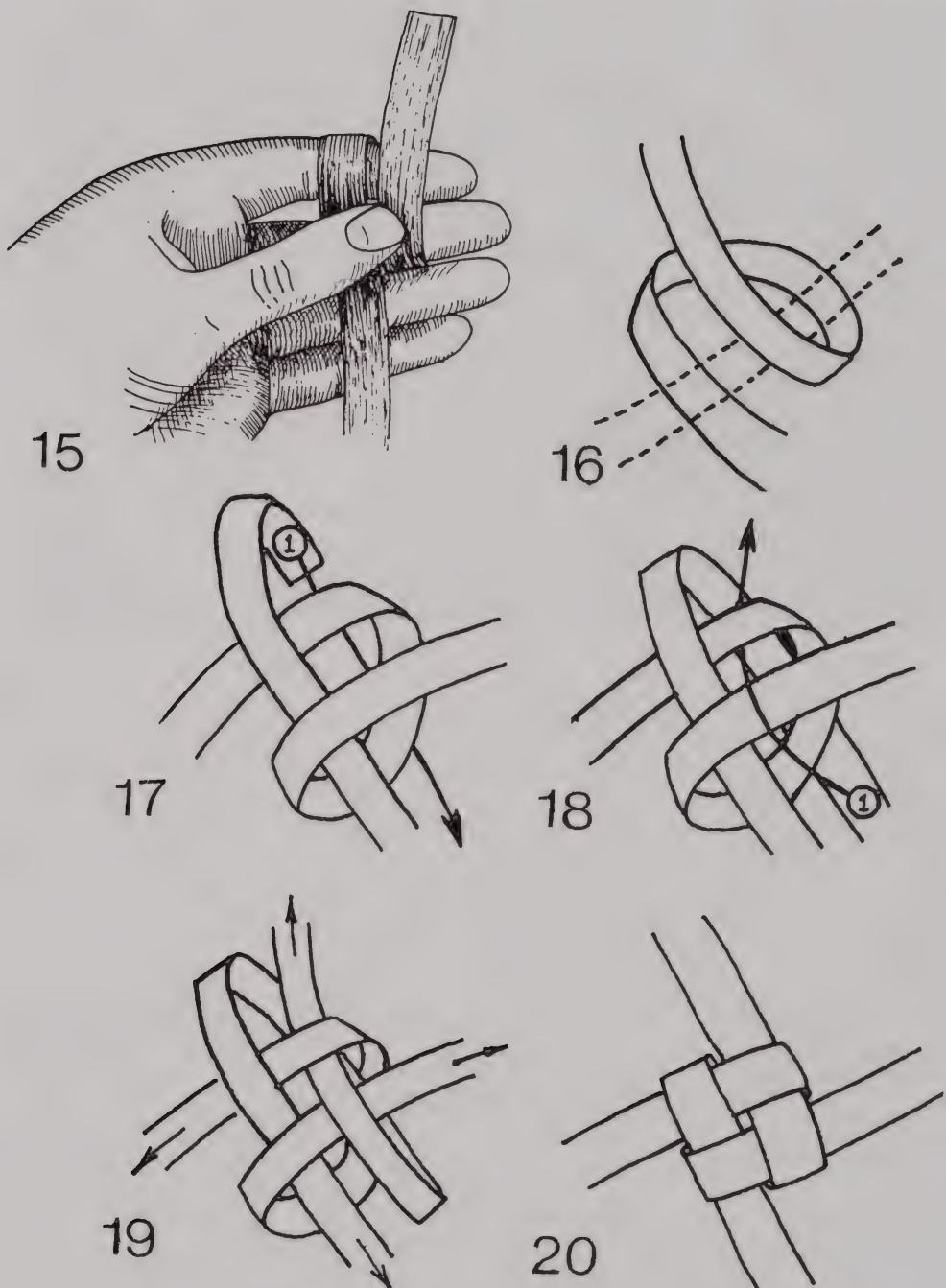


14

Figs. 13, 14. 13. A section removed from a sago leaflet to make the rolling toy called *manu fakarerere*. 14. *Manu fakarerere*, the toy which rolls in the wind.

Pakalili (windmill)

A coconut leaflet windmill which is made throughout the Pacific, is known as *pakalili* on Tikopia. It is constructed as shown in the figures and then threaded on to a short length of stick or sometimes on to the narrow end of the full length of a midrib taken from a coconut leaflet. The toy is made from two strips of leaf about 2 cm wide and 40-50 cm long. One of the strips is twisted around the first two fingers of the left hand as shown in Fig. 15 to form the hoop shown in Fig. 16. The second strip is placed through the loop as indicated in Fig. 16 and shown in Fig. 17. Strip 1 in Fig. 17 is taken behind the work as indicated by the arrow and brought to the position shown in Fig. 18. The same strip 1 is then carried over a strip and through the original hoop as indicated by the arrow in Fig. 18 to the position shown in Fig. 19. The knot is tightened by pulling on the ends of all the strips as indicated by the arrows. The knot is now complete and should look like Fig. 20. The ends of the windmill are trimmed so that they are of equal length. A hole is pierced through the centre so that a small stick can be put through. The windmill spins on the stick when held into the wind (Fig. 21), or it may be threaded on to the narrow end of a coconut leaflet midrib which is knotted at the end. It is held away from the wind, which holds the midrib firmly in a horizontal position, and the *pakalili* spins against the knot.



Figs. 15-20. Stages involved in the manufacture of the toy windmill or *pakalili*.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 21. The usual method of holding the *pakalili* into the wind.

Ngaringari (rat)

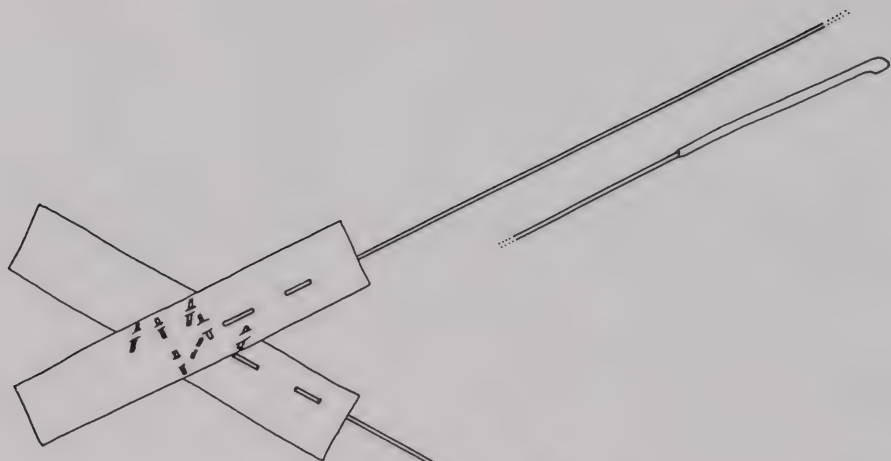
Amusing toys called *ngaringari* (rat) are made from sago leaflet and the midribs of two coconut leaflets. They are placed on the ground, usually on the hard sand when the tide is out and there is a very strong wind blowing. The wind lifts the body of the 'rat' off the ground, while the 'legs' trail behind. Sometimes the *ngaringari* dash across the sand exposed by the low tide and, on reaching the water, leap into the air. (The Tikopians are familiar with the word *kiore*, the more common Polynesian term for rat, but seldom use it.)

The three variations illustrated all work on the same principal; this consists of a construction with a large flat area, slightly concave beneath, which rides on the wind, dragging behind it two long projections to hold the balance. The length and weight of these 'legs' is varied to suit the amount of wind.

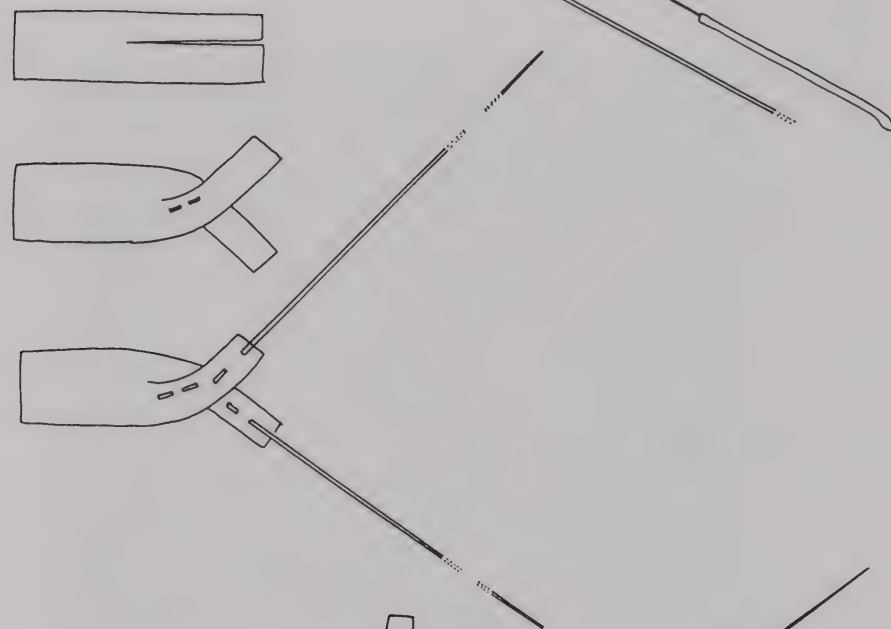
The *ngaringari* illustrated in Fig. 22 is made from two rectangular sections, each 30 x 7 cm of sago leaf which are crossed and pinned together with short lengths of *sina*. A length of coconut leaflet midrib is threaded into each rectangle as shown. On this example, because of especially strong wind, a weight was added to the midribs by the addition at the end of each, of a 12 cm length of petiole from a small pawpaw leaf. The over-all length of the toy was 67 cm.

The second *ngaringari* is made from a single 16 x 17 cm rectangle of sago leaf which is split half way along its length. One of the resulting sections is folded across the other and pinned in place with a length of *sina*. A length of coconut leaflet midrib is threaded longitudinally into each section (as in Fig. 23) and the toy is complete.

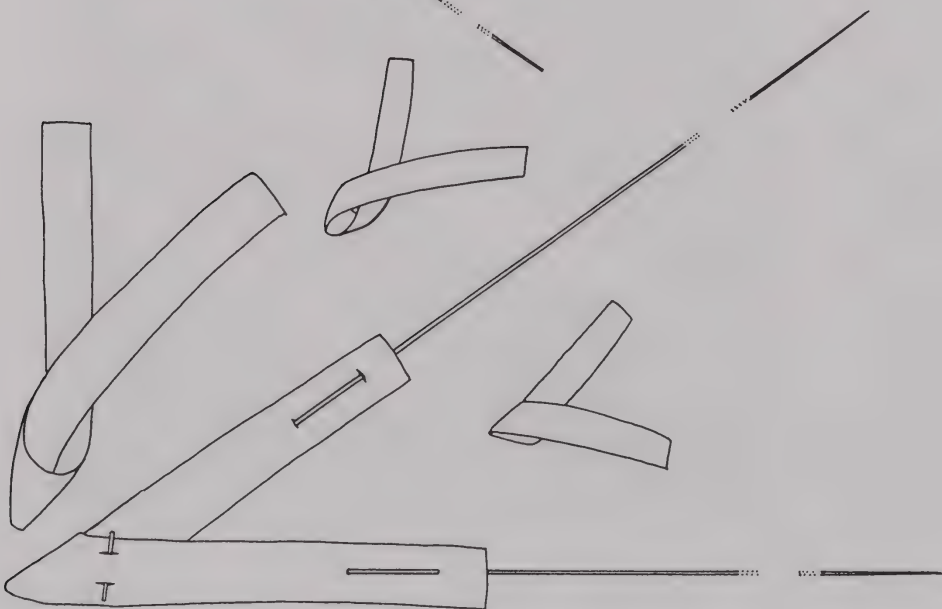
22



23



24



Figs. 22-24. Three types of a windblown toy called *ngaringari* or rat. 23. Stages of manufacture of one type.

The third *ngaringari* is also made from a single rectangle of sago leaf which is rolled and twisted into the shape shown in Fig. 24 and then pinned into place. Again the lengths of midrib are attached as in the other examples. This type is also sometimes used without the midribs.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 25. A model sailing canoe (*vaka fai manu*) made by Leslie Tufakimaru.

Vaka fai manu (model sailing canoes)

When the sea is below high water and its surface calm behind the protection of the reef, boys sometimes sail and race their model canoes. The simplest ones belonging to the youngest boys may consist of half a coconut husk with a leaf threaded on a stick for a sail. As the boys grow older and more time and effort is spent on the toys, they are recognisable as miniature replicas of the full-sized sea-going canoe or *vaka fai manu*. Some boys of twelve years of age show a remarkable knowledge of the construction and subtleties of the form of the hull and outrigger.

The model *vaka fai manu* (Fig. 25) is carved from soft wood, usually that of the *te puka* tree (*Hernandia* sp.). A large bush knife is the only tool available and smoothing off may be done with a pebble of dead coral, a leaf from a rough-leaved "sand paper tree", a piece of broken glass, or a combination of any of these.

Pith from the sago palm is sometimes used to make toy ships. These are based on the government vessels which call at the island, or on fishing boats seen in the vicinity, but the model sailing canoes always follow the form of the indigenous craft. Frequently the hull and outrigger proportions are modified, becoming longer and narrower for streamlining and to allow a larger sail to be carried. No attempt is made to hollow out the hull and a raised section near the bow and stern show the approximate outline of the bow and stern covers (*te puke*), which in the full sized canoe are carved separately and lashed into place.

Pegs of harder wood, commonly *te ora* (*Canthium* sp.), are driven into the hull and outrigger and to these the thwarts (which do not always follow the form of those on the full-sized canoe) are tied. The mast is also of hard wood driven into the hull and sails of varying sizes and often fantastic shapes are attached. For these a sheet of thin plastic is the preferred material. It is said that in earlier times cotton cloth, bark cloth, leaves or *kaka* (the sheath from the base of a young coconut leaf) were used but all of these have the disadvantage of becoming heavy when wet.

Vaka farakau (leaf canoe)

The *vaka farakau* is a model boat (*vaka*) made from a single leaf of the *farakau* tree (*Ochrosia* sp.). The leaf is tied into a curve so that the part of it that is above the water acts as a sail (Fig. 26).

Towards the tip end of the leaf a hole is made on each side of the midrib and a strip of *karava niu* (fibre from coconut leaf midrib) threaded through and tied. The tip of the leaf is then pulled back by the cord, the other end of which is wrapped around the petiole three times before being secured to hold the leaf in its curved position. The bend is made so that the upper surface of the leaf will be in contact with the surface of the water (Fig. 27).

For cultural reasons, these images have been removed.
Please contact Auckland Museum for more information.

26

27

Fig. 26-27. The leaf sailing canoe called *vaka farakau*. 26. The canoe made from a single leaf. 27. Harold Arikimuakisolomonu demonstrates the method of sailing the *vaka farakau*.

The following incantation may be recited to encourage speed when the boats are raced on the still water on the reef shelf at low tide (Fig. 27).

Tao tao marie
Tou kau fe.

Acknowledgements. I would like to acknowledge the assistance of Leslie Tufakimaru, Hosea Fetauta, Harold Arikimuakisolomonu, Roman Muakiteava, Badderly Forau and Fred Maseu, all of whom were pupils at Safoa School; they took the time to gather the materials and teach me to make the toys and demonstrate how they work. Thanks to Pu Tevaea of Tafua clan for permitting his photograph to be taken.

REFERENCES

TE RANGIHIROA (P. H. BUCK)

- 1927 *The Material Culture of the Cook Islands (Aitutaki)*. Memoirs of the Board of Maori Ethnological Research, Vol. 1. New Plymouth, Thomas Avery.

MAORI DOG-SHAPE BOWLS

D. R. SIMMONS

AUCKLAND INSTITUTE AND MUSEUM

Abstract. Two groups of dog-shape bowls are described; an older group made with stone tools and a newer group made with metal tools.

In 1922, Dr. H. D. Skinner identified a type of wooden bowl "which represents a four-legged animal of indeterminate species. The animal can hardly be other than the dog, which the Maoris brought with them to New Zealand, or the pig, which is traditionally remembered." (Skinner 1922:182). Traditional stories of dogs are not uncommon, however the association of a specific named dog with dog bowls for serving food is indicated by the following.

In 1890, Auckland Museum received a dog bowl in the collection of Gilbert Mair. This was given the name of Potakatawhiti by Mair and was said to be "used for serving up preserved birds to visitors at a feast. Carved by Wero c. 1865 it represents Ouenuku and Whakaturia and their dog Potakatawhiti." (Ethnology Dept. catalogue entry No.48, Auckland Museum). This item was exchanged to Otago Museum in 1940 (Otago Museum D40.318, width 45 cm, depth 46 cm. It is now used as a collection box). It is actually a dog carrying a lidded bowl on its back, not a dog-shape bowl.

The association of Potakatawhiti with dog bowls is interesting. Potakatawhiti was the dog of Houmaitawhiti, father of Tama Te Kapua of the Arawa. The dog was eaten by Uenuku and Toi Te Huatahi because it had eaten tapu material belonging to Uenuku. When Whakaturia's people came looking for the dog it howled from inside Toi's great belly. A war ensued which led to the emigration of Tama Te Kapua and the Arawa canoe from Hawaiki (Grey 1928:54). This version of the story was written in 1853 by Wiremu Maihi Te Rangikaheke of Ngati Rangiwewehi (see Simmons 1973:62). A similar version is given by Eruera Te Uremutu of Ngati Whakaue in 1846 (Simmons 1976:70). The name was also given by Uenukukopako to his dog which was killed on Mokoia Island (Grey 1928:89). Uenukukopako lived about six generations after Tama Te Kapua (Simmons 1976:276, 284-5).

It is appropriate, in the Bay of Plenty — Arawa territory, that such bowls be used to serve food to the paramount chiefs, though the custom is not restricted to that area. A very simple bowl in Auckland Museum from the Waikato region has a head and tail on a globular body. Up to the 17th century Arawa influence was quite important in the heart of Tainui territory (Robertson 1958:51). Such bowls were the personal food bowls of named *ariki* (paramount chiefs) such as Hinematiaro of Ngati Porou. Only another *ariki* of equivalent rank could eat from the same bowl. Unknown

sons raised in a different place often make themselves known in stories by taking some of their father's food, or by other actions which to a person of lesser mana would have involved serious harm.

The bowls

The dog-shape bowls can be divided up into two series, those made with stone or soft metal tools and those made with steel tools. We shall consider firstly five dog-shape bowls made with stone or soft metal tools. These are listed as nos. 1-5.

1. (Figs. 1,2) Auckland Institute and Museum 22968. Length 51 cm, height 28 cm, width 37 cm. Deposit H. E. Blundell.

The simplest form is this bowl from Waikaretu, south of Port Waikato made with stone tools. It has a fairly rudimentary spout, a head and a big tail. The head is of manaia form rather than of a dog but would still have been used in the same way as the dog-shape bowls of more realistic form. Stevenson says "viewed from the side, this bowl resembles a grotesquely fat animal with a small head and short tail" (Stevenson 1939:206; Simmons 1973:62).

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 1. The Waikaretu bowl. Auckland Institute and Museum 22968.

For cultural reasons, these images have been removed.
Please contact Auckland Museum for more information.

Fig. 2. The Waikaretu bowl. Auckland Institute and Museum 22968.

2. (Fig. 3). Peabody Museum of Archaeology and Ethnology, Harvard, 53496. Length 66 cm, depth outside 22 cm. Ex Boston Museum 1899. This bowl is part of the Boston Museum collection which may have been acquired before 1825.

The bowl had been made with stone or possibly soft metal tools. The head is realistic with teeth and serrated paua shell for the eyes. Decoration consists of planed spirals of East Coast form on the shoulders and Arawa style *pakati* and *haehae* on the body. The penis is slightly raised.

Fig. 3. Bowl. Peabody Museum, Harvard, 53496.

3. (Figs. 4,5) Auckland Institute and Museum 47188. Length 62 cm, width 28.6 cm, depth 19.7 cm. Purchased Edward Earle Vaile Fund. Found at Otangiwainuku near Te Puke, Bay of Plenty.

The bowl, made with stone tools, is both human and dog-shaped. It has a human head, hands and feet but a dog penis. The head has a grooved spout on top and the tail is a round knob. The bowl has cracked and been repaired on one side with flax fibre. At some later date after its manufacture two holes have been pierced in either side to lash on a lid. Decoration on the arms and legs is by *taratara a kae* while the head carries a Gisborne style *unaunahi*. Traditional information would suggest the carver was named Nga Korongaengana who was of Ngati Porou descent.

For cultural reasons, these images have been removed.
Please contact Auckland Museum for more information.

4

5

Figs. 4,5. The Te Puke bowl. Auckland Institute and Museum 47188. 4. Side. 5. Base.

4. (Fig. 6). Staatliches Museum für Völkerkunde, Dresden, D.D.R., 22874. Length 50 cm, width 30 cm, depth 18 cm. Purchased from W. H. Oldman in 1908. This is probably the bowl mentioned by Skinner as being sold to Dresden “some years ago” (Skinner 1922:183).

The bowl has a manaia type head, short body and slanted back legs. The shoulders are decorated with *whakaironui* pattern spirals (*pakati* and *haehae*) of East Coast form while the body is decorated with *pakati* in leaf-shape *haehae* lines. The carving has been done with stone tools by an East Coast carver.



Fig. 6. The Dresden — Oldman bowl. Staatliches Museum für Völkerkunde, Dresden, 22874. Sketched in Dresden by D.R.S.

5. (Fig. 7). Staatliches Museum für Völkerkunde, Dresden, D.D.R., 12164. Length 95 cm, width 52 cm height 26 cm. Purchased from Umlauff in Hamburg in 1899.

The bowl, made with stone tools, has a realistic head with tongue. The tail has a pouring spout groove but this groove does not penetrate the bowl. The shoulders and belly of the bowl are decorated with finely carved *whakaironui* spirals. On style and tradition this bowl is probably East Coast in manufacture.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 7. Hinematiaro's bowl in Staatliches Museum für Völkerkunde, Dresden, 12164.
(Photo of cast now in Auckland Museum).

By courtesy of the Staatliches Museum für Völkerkunde, Dresden, a cast has now been placed in Auckland Museum. Knowledgeable elders have been able to recognise the bowl as that which formerly belonged to Hinematiaro of Ngati Porou. The bowl is clearly marked with female sex. The carver is traditionally known as Te Rakau Hapawai, also of Ngati Porou (pers. comm. Te Riria).

This last bowl (No. 5) is the most important one of the early group not only because of its traditional importance but also for its use as a model from which a particular group of carvers were able to carve further bowls. In particular the Ngati Tarawhai group at Ruato, Lake Rotoitoi, comprising Te Amo a Tai, Wero Taroi, Anaha Te Rahui and Tene Waitere. About 1865 the dog bowl formerly in the Mair collection in Auckland Museum (Otago Museum D40.318) had been carved by Wero Taroi. This was a dog carrying a lidded bowl. There is another bowl of this type in Dresden (13818). It consists of a dog figure carrying a round lidded bowl on its back (overall length 28 cm, depth 17 cm, height 25 cm). I made a note that it was the work of "Anaha Te Rahui" but it was not possible to photograph the piece. A similar lidded bowl on the back of a dog is to be found in the collection of the American Museum of Natural History in New York (No. 80.0.4111). Again I have suggested in my notes that the carver was "Anaha Te Rahui". This bowl which was purchased in New York was on display in a sealed case and could not be handled or measured (Simmons 1982:263). These lidded bowls on dogs' backs are probably early attempts at the dog shape which was known traditionally but for which there were, at that stage, no viewable examples in New Zealand. The museum catalogue in Dresden records that photographs of bowl 5 (12164) were sent to the Arawa carvers at Ruato about 1900. The photos from Dresden gave the necessary model so that the form could be copied. Once photographs were available for models, bowls again began to be produced, replacing the dog with lidded bowl form. However, the carving was now with modern steel tools. The dog-shape bowls thus produced are listed in nos. 6-9.

6. (Fig. 8). Staatliches Museum für Völkerkunde, Dresden, D.D.R., 13726. Length 84 cm, width 41.3 cm, depth 24 cm. Purchased from H. Robley 1902.

This bowl, carved in the style of Wero Taroi with steel tools has a more manaia-like head but otherwise follows No. 5 (12164) fairly closely except that some Arawa style decoration has been added. Despite the closeness of the date this bowl would appear to be a copy of Fig. 7.

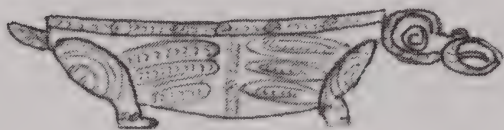


Fig. 8. The Dresden — Robley bowl by Wero. Staatliches Museum für Völkerkunde, Dresden, 13726. (Sketched in Dresden by D.R.S.).

7. (Fig. 9). Museum of Archaeology and Anthropology, Cambridge, U.K., Z 63444. Length 104.5 cm, width 53 cm, depth 29 cm. Received in 1905 and was purchased in London by Sir Julius Werhner.

This bowl “was probably carved by a Ngati Pikiao carver at Ruato” (Neich 1977:164). The head is manaia-like with closed mouth and the ears are placed on top. The body is decorated with a large *whakaironui* spiral on each side of the stomach and similar spirals on the shoulders but the bowl has a clearly marked rim. The tail is grooved and a hole is provided in the wall so the groove could act as a spout. The bowl has female sex. It was illustrated also by Barrow in 1974 (Barrow 1974:127).

For cultural reasons, these images have been removed.
Please contact Auckland Museum for more information.

Fig. 9. The Cambridge bowl, Z 63444.

8. (Fig. 10). Otago Museum, Dunedin. D57.549. Length 73.5 cm, width 33.5 cm, depth 19.5 cm. Obtained per K. Webster from the collections of Bankfield Museum, Halifax, on the dispersal of that museum's collection.

Fig. 10. The Bankfield bowl. Otago Museum D57.549.

The bowl is similar to the last with manaia-type head, large *whakaironui* spirals on sides of stomach and shoulders and ears set back on the head. The feet detail is more simply executed but a similar band of carving is made around the rim. It has no sex and is made with steel tools, probably by Wero (Neich 1977:164).

9. (Fig. 11). Auckland Institute and Museum 50595A, length 50 cm, width 30 cm, depth 18 cm. Obtained by exchange from the Australian Museum, Sydney.

The stance of this bowl with lower back legs is similar to No. 4 (22874) in Dresden but the decoration is much closer to No. 5 (12164) also in Dresden. The carving is made with steel tools and Roger Neich considers it the work of Te Amo a Tai (pers. comm.). At some time the bowl has been provided with a copper rim to hold it together after cracking.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 11. The Sydney bowl. Auckland Institute and Museum 50595A.

Feast bowl. Location unknown but length 104 cm (Beasley 1919:70).

In 1922 H. D. Skinner considered a bowl then in the possession of H. G. Beasley to be a hybrid between a dog bowl and a feather box (Skinner 1922:183). It is a feast bowl (Beasley 1919:70) with a female figure at one end and a body with a tail above a figure at the other.

Discussion

The name of Potakatawhiti is associated with dog bowls which were used to serve the personal food of the *ariki taiopuru* or *ariki tapairu*, the paramount chief or chief-tainess of a region. Hinematiaro of Ngati Porou was such a woman who had all the rights and privileges of a man. Her food was served in the large bowl (here listed as No.5) which was certainly made in the 18th century. The Waikato bowl (No.1), though of different shape, is undoubtedly a dog bowl used for serving food to a per-

son of very high rank who lived in the 18th century or earlier. The bowl from the Peabody Museum (No.2) is old and has been made with stone or possibly soft metal tools. The realistic head shape can be allied with No.5 in Dresden. The Te Puke bowl (No.3) is a dog/man. The subsequent adventures of Toi Te Huatahi recount that in one version he was turned into a dog. His wife when visiting relatives had to confess that the cur following her was Toi. This story would seem to be the origin of the man/dog form. The bowl is made with stone tools and was already old when it was placed in the cave where it was found.

The other dog bowls are all the work of carvers whose work can be identified and who were working in the tradition of steel tools. All were from Ngati Tarawhai or Ngati Pikiao at Ruato where photographs were sent of Hinematiaro's bowl (No.5). Dog bowls or other items often show the sex of the person for whom they are made. Hinematiaro's bowl is female, the Te Puke bowl is male, the Harvard bowl is male, the Cambridge bowl is female and the Dunedin and Auckland bowls are sexless.

Dog bowls are rare and important status symbols. The stone tooled examples were made for named individuals of *ariki taiopuru* and *ariki tapairu* rank. The steel tooled examples made by the Ruato carvers of Ngati Tarawhai would appear to be copies of the Hinematiaro bowl (No.5). Judging by the Sydney-Auckland bowl (No.9), photographs of the second Dresden bowl (No.4) may also have been available. The Ngati Tarawhai bowls are finely made but were not made for named individuals as the other bowls certainly were. The speed with which the copies reached Europe is surprising but not unusual given the relationship between the Ruato carvers, Charles Nelson and the market overseas (Neich 1983:255, 259). In 1905 Nelson sold the complete house Rauru to Hamburg Museum. It will be noted that the dog bowl copies reached Europe about the same time.

REFERENCES

- BARROW, T.
1974 *Maori Wood Sculpture*. Wellington, A. H. & A. W. Reed.
- BEASLEY, H. G.
1919 A Maori food bowl, "Kumete". *Man* 19:70.
- GREY, Sir George
1928 *Nga Mahi a Nga Tupuna*. 3rd ed. Maori texts of the Board of Ethnological Research, Vol. 1. Wellington.
- NEICH, R.
1977 Historical Change in Rotorua Ngati Tarawhai Woodcarving Art. M.A. thesis, Victoria University.
1983 The Veil of Orthodoxy: Rotorua Ngati Tarawhai Woodcarving in a Changing Context: in *Art and Artists of Oceania*, S. M. Mead and B. Kernot (eds.). Palmerston North, Dunmore Press.
- ROBERTON, J. B. W.
1958 The Significance of New Zealand Tribal Tradition. *J. Polynes. Soc.* 67:39-57.

SIMMONS, D. R.

- 1973 Anthropomorphic and zoomorphic Maori bowls from Hauraki and the Bay of Plenty. *Rec.Auckland Inst.Mus.* 10:59-64.
- 1976 *The Great New Zealand Myth*. Wellington, A. H. & A. W. Reed.
- 1982 A catalogue of Maori artefacts in the museums of Canada and the United States of America. *Bull.Auckland Inst.Mus.* No.12:1-421.

SKINNER, H. D.

- 1922 A type of Maori carved wooden bowl. *J.Polynes.Soc.* 31:182-4.

STEVENSON, A. G.

- 1939 Maori Wooden Bowls. *Rec.Auckland Inst.Mus.* 2:197-210.

THE SIGNIFICANCE OF DECORATION IN A MAORI MEETING HOUSE

D. R. SIMMONS

AUCKLAND INSTITUTE AND MUSEUM

Abstract. A previously unpublished manuscript is presented together with illustrative material and comments.

The following brief manuscript is contained in the archives of the Ethnology Department of the Auckland Museum. It has been taken down from Te Whare Turuwhenua by an unknown scribe. The naming of the *poutahu* as the Tane pole is evidence of an East Coast-Urewera origin. Tane is the progenitor god who made man in the traditions of the Ngati Kahungunu, Ngati Porou, Ngai Tahu, Rongowhakaata and Tuhoe tribes. In the rest of New Zealand the progenitor god is Tiki. Discussion with elders have confirmed that Te Whare Turuwhenua's interpretation is correct for the Bay of Plenty or East Coast and that he was of the Tuhoe people. As yet I am unable to confirm to which tribal group he belonged although it has been suggested he may have belonged to Ngati Manawa.

This paper is illustrated by photographs (Figs. 1-5) from the Gilbert Archey annotated photo archive in the Ethnology Department. These East Coast houses show the main points described in the manuscript.

The information contained in the manuscript has been known as oral tradition but has never before been put into written form. It is now published even though exact details of its origin are as yet unknown.

THE SIGNIFICANCE OF DECORATION IN A MAORI MEETING HOUSE

(Informant: Tewhare Turuwhenua)

All the decoration in a meeting house is significant, and is used as a mnemonic by the people.

The front post represents Tane the father of the people, and the life-giving element, the back post represents Hine-nui-te-Po, Tane's daughter and wife (an incestuous relationship necessary because Tane was the first man, the woman he had created for his wife had died, and Hine-nui-te-Po was the only other female in the world).

Hine-nui-te-Po stands for death, and therefore the line up the Tane post, along the ridge-pole and down the Hine-nui-te-Po post represents the journey through life. The Tane pole was in old times based on the genitals of a live slave to represent the life-element going into the post. Because life returns to the sky (eternity), in the building, when the ridge-pole was to be placed on the Tane-post, a live hawk was caught and imprisoned by the end wing feather between post and ridge-pole and allowed to flap until the feather broke free and the bird flew away. Two spirals were carved on the barge-boards at the apex; these represented Male and Female. They might later be covered in the building.

The history of the tribe was depicted in the rafter pattern applied to the ridge-pole; the continuous line represented the continuity of the tribe. The genealogies of families within the tribe were shown on the rafters and they ended at a carving of an ancestor. Although female ramifications were shown, the primary line was male. The lines, spirals, buds, etc. in the pattern stood for definite people, and showed their biological relationships. The oldest family branches were nearest the Tane-pole, and the youngest were nearer the back of the building (the Hine-nui-te-Po end). The colour red signified prosperity, and black stood for adversity. The relative amounts of these colours showed how the tribe had fared. The tukutuku panels had names and were pictorial representations, but had the additional significance of providing steps by which the dead could re-mount to the tribal life-line — the ridge-pole. The common step pattern symbolised the journal [journey?] of Maui from earth to heaven.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 1. Te Mana o Turanga house on Whakato marae, Manutuke opened in 1883, Rongowhakaata tribe, Gisborne. The *poutahu* in the front wall supporting the ridge pole. This is the Tane post, the life-giving post. Also depicted are the ancestors Ruapani, Rongowhakaata and Kahungunu. This and the left side of the house are the *manuhiri* (visitor) area.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 2. Te Mana o Turanga. The *poutuarongo*, the back wall post, which is the post of Hine-nui-te-Po, the goddess of death. The figures depicted are Taua, Mahaki-ewekaroro and Hauiti. This post and the right hand side of the house are for the *tangata whenua* (home people).

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 3. Te Mana o Turanga. The *poutuarongo*, ridge pole, rafters and ancestral *poupou* on the wall. The ridge pole is the complete or genealogical tree, the rafters show the relationship between this and the main line, the genealogies of the tribal families whose ancestor is depicted. The ancestors to the rear are younger lines than those at the front.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 4. Tamaterangi on Rangiahua marae, Wairoa, (Ngati Hinemanuhiri tribe). The *heke* or rafters connect with the main line on the ridge pole. The *poupou* in this instance are painted and not carved.

For cultural reasons, this image has been removed.
Please contact Auckland Museum for more information.

Fig. 5. Te Poho o Hiraina, Pakowhai, Rongowhakaata. This house, opened in 1885, was burnt down in 1949. There are no figures on the wall. It was likely that the wall symbolism has been left in favour of decoration as in many modern houses but *poutahu* and *poutuarongo* are still present if uncarved, supporting Haraina's backbone which still carries the genealogy.

NEW AND INTERESTING RECORDS OF ADVENTIVE PLANTS FROM THE AUCKLAND INSTITUTE AND MUSEUM HERBARIUM 10

E. B. BANGERTER

AUCKLAND INSTITUTE AND MUSEUM

Abstract. This tenth list of some recent additions to the Auckland Institute and Museum Herbarium (AK) and re-determination of earlier gatherings provides new records for some adventive species and further information on the distribution of others.

The main source of material for this tenth list has been by exchange with D.S.I.R., Botany Division, Christchurch (CHR), the National Museum, Wellington (WELT) and the Herbarium of the University of Auckland (AKU). Mr A. E. Esler, D.S.I.R., Auckland, has presented a number of voucher specimens and Mr A. E. Wright, Botanist of this Museum, has provided material collected during several field excursions.

The nomenclature adopted in this paper follows that of volume 3 of the *Flora of New Zealand* (Healy & Edgar 1980) for monocotyledons and that of the series of checklists published in the *New Zealand Journal of Botany* from 1978 onwards by members of the D.S.I.R., Botany Division staff at Christchurch for dicotyledons.

All specimens are cited by the AK number and by the collectors' numbers where these are provided. Unless otherwise stated the specimens may be regarded as the only material of the species possessed by the Herbarium and, where no previous literature is cited, as first records to the best of my knowledge at the time of writing.

BERBERIDACEAE

Berberis vulgaris L.

Maniototo Co, Ranfurly, waste land and grassland, 1966, A. J. Healy, AK 160136, (dupl. ex CHR 152486).

Sykes (1982b) cites Thomson (1875) as the first record for the European barberry and notes that early records for this species mostly refer to *B. glaucocarpa*.

Mahonia aquifolium (Pursh.) Nutt.

Halswell Co., Otahuna, Tai Tapu, semishade, 1964, W. R. Sykes 593/64, AK 160157, (dupl. ex CHR 151779).

On the label of the above gathering of the Oregon grape a description of the plant reads "shrub c. 6ft. [1.8 m]; fls yellow". Its distribution according to Sykes (1982b) is limited to Hutt Valley, Canterbury and Otago. It is listed by Healy (1969) and was first recorded by him (Healy 1958) from Hutt Valley and Haywards.

FUMARIACEAE

Fumaria bastardii Boreau

Auckland, Mt Albert Research Centre, growing against crib wall, 1981, A. E. Esler, AK 162549, det. A. E. Esler.

This fumitory was discovered by Mr A. E. Esler too late to be recorded in Garnock-Jones (1979). The above voucher specimen was kindly presented by the collector.

CRUCIFERAE

Brassica barrellieri (L.) Janka subsp. *oxyrrhina* (Cosson) Ball & Heywood

Mangonui Co., Tokerau Beach, 1980, P. J. Garnock-Jones 1373, AK 160121, (dupl. ex CHR 361551).

This duplicate from the Botany Division Herbarium is from the only known locality according to Garnock-Jones (1979), in which publication the first record may be found. A note with the specimen states "sand dunes under and among *Lupinus arboreus*".

Iberis umbellata L.

Mangonui Co., Taipa, quarry, 1975, G. B. Rawlings, AK 160124, conf. P. J. Garnock-Jones 1980, (dupl. ex CHR 366660).

Garnock-Jones (1979) may be consulted for the distribution of this candytuft, which was first recorded by Healy (1958). The latter author again mentions it (Healy 1959) and later lists it for Canterbury (Healy 1969).

Lepidium hyssopifolium Desv.

Christchurch, Mt Pleasant, roadside among grasses, 1980, P. J. Garnock-Jones 1470, AK 160123, (dupl. ex CHR 363056).

The first record for this species is in Garnock-Jones (1979) where the distribution is shown as from the far north, Kermadec Is., down to Southland.

POLYGALACEAE

Polygala serpyllifolia Hose

Dunedin, open rocky area near summit of Mount Cargill, 2200 ft. [615.7 m], 1983, A. E. Wright 5538, AK 16302.

The first record for heath milkwort, from Otago, 1951, is to be found in Webb (1981), where the distribution is given as Wellington, Otago and Southland.

CARYOPHYLLACEAE

Cerastium semidecandrum L.

Mackenzie Co., Lake Tekapo, Mt Hay Station, roadside, 1965, A. J. Healy, AK 163121, det. A. J. Healy, (dupl. ex CHR 152252).

Little mouse-ear chickweed was first recorded by Healy (1969) from Canterbury as stated in Garnock-Jones (1981). A habitat note with the above gathering reads "common near margin of tarn".

Dianthus plumarius L.

Canterbury, Lyttelton Port Hills, Dyers Pass Road, roadside bank, 1979, P. J. Garnock-Jones 1286, AK 160109 (dupl. ex CHR 363044).

Healy (1958) first recorded this pink from the Maniototo Plains. The above specimen is from the locality given in Garnock-Jones (1981).

Illecebrum verticillatum L.

Northland, NE Waipoua Forest, 1972, G. B. Rawlings, AK 160119, (dupl. ex CHR 227564).

The above specimen is a duplicate of the one cited in Garnock-Jones (1981). A correction slip with this publication gave the first record as Rawlings (1974). No other locality is cited in these publications.

Paronychia brasiliiana DC.

Bay of Plenty, Pikowai Reserve, 1980, P. J. Garnock-Jones 1395, AK 160152, (dupl. ex CHR 361597).

This specimen is another voucher acquired by exchange with Christchurch, the first record being published in Garnock-Jones (1981). A habitat note states "short grass driven over by cars".

CHENOPODIACEAE

Chenopodium erosum R.Br.

Christchurch, Hoon Hay, margin of soya bean crop, 1968, P. C. Read, AK 160098, det. A. J. Healy, (dupl. ex CHR 174396).

Christchurch is the locality for the first record of this species in Sykes (1982a), where a few more South Island areas are given and where it is said to be rare.

GERANIACEAE

Geranium rubescens Yeo

Stewart Island, Halfmoon Bay, Oban, 1963, P. Hynes, AK 92087 as *G. robertianum*, det. W. R. Sykes 1983.

The first record for this geranium, collected by Healy in 1956 from near Invercargill, is in Sykes (1982b). Distribution is mainly in the South Island except for Upper Hutt in the North Island.

CUCURBITACEAE

Citrullus lanatus (Thunb.) Matsum. & Nakai

Waitemata Co., Whatipu, 1961, K. Wood, AK 73354; Mangonui Co., Spirits Bay, 1962, P. Hynes, AK 150995 (presented 1979) as *C. vulgaris* Schrad.

Corrigendum. The above data replaces the data published for this species in the previous list (Bangerter 1983:167).

EUPHORBIACEAE

Euphorbia exigua L.

Springs Co., Lincoln, cultivated land, 1962, F. C. Allen, AK 163187, det. A. J. Healy (dupl. ex CHR 143756).

The first record for dwarf spurge is in Healy (1957), the plant being collected in 1956 by F. C. Allen at Culverden. Healy (1969) also lists the species for Canterbury. The limited distribution of this spurge in Marlborough and Canterbury is noted by Webb (1981).

MIMOSACEAE

Acacia mearnsii de Wild

Bay of Islands Co., c. 6km NE of Kerikeri, Kurapari Road, 1972, A. E. Orchard 3584, AK 130907 (as *A. dealbata*), det. C. J. Webb 1980; Waitemata Co., Wairau Creek estuary, Milford Marina, 1980 E. B. Bangerter 5478, AK 152273, det. W. R. Sykes; Auckland City, St Heliers, 1982, A. E. Wright 5173, AK 15983.

Although the possibility of misidentifications of earlier gatherings is not ruled out, the first certain record for the black wattle is to be found in Webb (1980). The three specimens above add localities in the North Island, none being as yet cited for the South Island. Dr Orchard's note on habitat says "naturalised in *Leptospermum* scrub"; my own states "one tree c. 4m tall overhanging *Avicennia* in creek with *Foeniculum vulgare* and *Raphanus* sp. on the bank."; Mr Wright's has "one or two naturalised trees on seacliffs east of Achilles Point".

VITIDACEAE

Parthenocissus tricuspidata Planch.

Great Barrier Island, Tryphena Hill, roadside on rocks, 1964, R. Cooper, AK 119783, approb. W. R. Sykes, 1983.

Poison Ivy is not included in Sykes (1982b) as the specimen above was not seen by him until after the publication of his checklist.

COMPOSITAE

Calendula arvensis L.

Auckland, waste ground, 1959, Mrs D. V. G. Woods, AK 11836.

This is the first record for this marigold so far as I can ascertain.

Solidago canadensis L.

Waitemata Co., Milford, Crown Hill, footpath through waste area, 1982, E. B. Bangerter 5539, AK 159130.

Localities in Healy (1944) are all in the South Island but he refers to Allan (1940) where it is stated that this golden-rod "escapes in the North Island". It is also listed in Healy (1969) for Canterbury. The habitat note with the above gathering says "garden outcast with *Hedychium* sp., *Pelargonium* sp., *Daucus carota* and *Solanum nigrum*".

Stuartina muelleri Son.

Banks Peninsula, Scarborough Hill, 1947, A. Wall, AK 23311, det. H. H. Allan.

Cheeseman (1906) records this plant from Marlborough, the record being repeated by Thomson (1922) and Allan (1940) with few added localities. Healy (1943) adds further localities. Prof. Wall's gathering is the only one in AK.

PLANTAGINACEAE

Plantago varia R. Br.

Vicinity of Wellington, T. F. Cheeseman, AK 91121.

Sykes (1981) attributes the first record for this plantain to A. Cunningham (1838), who attributed it to his brother Richard as early as 1834, collected "between the villages of Ngaire and Wainui" in the North Island. The specimen cited above is not dated but it may serve as a voucher for a record published by Cheeseman (1906), who gives localities in both Islands. Among later authors is Healy (1943) who records North Canterbury as a locality.

CAMPANULACEAE

Campanula rapunculoides L.

Wellington, Hataitai, Neve Road, weed in garden, 1979, J. Moreland, AK 152500, det. P. J. Brownsey, (dupl. ex WELT).

The creeping bellflower, according to Matthews (1975) is usually found as a garden escape. It was first recorded by Allan (1940) but no locality was specified. Healy (1959) lists the species for Riccarton Bush and its distribution is summarised in Sykes (1981) as the Wellington area in the North Island and "many places southwards to Otago" in the South Island. The above specimen acts as a voucher for the Wellington area.

LABIATAE

Prunella laciniata (L.) L.

Waikato Co., southern side of Ngaruawahia, Highway 1, grass verge, 1982, E. K. Cameron 1882, AK 163057 (as *P. vulgaris*), det. W. R. Sykes, (dupl. ex AKU).

Sykes (1978) lists this species among those "for which the record is 'unsubstantiated'," but his determination of the above specimen, which has cream coloured flowers, authenticates the occurrence of the plant in New Zealand.

IRIDACEAE

Chasmanthe bicolor (Gasp.) N. E. Brown

Little Barrier Island, damp ground around the mouth of the Waikohare Stream, 1981, A. E. Wright 4138, AK 154899.

The first record for this species was published by Healy & Edgar (1980) from Auckland City. The above gathering extends its distribution.

Tritonia crocata (L.) Ker-Gawl.

Waitemata Co., Albany, Lonely Track Road, 1982, A. E. Wright 5198, AK 160624.

The first collection of this plant was in 1971 from Onehunga according to Healy & Edgar (1980) where the first record was published.

JUNCACEAE

Juncus capitatus Weigel

Hobson Co., Babylon Coast Road, N of Dargaville, 1977, J. E. Braggins, AK 15148, det. A. E. Wright 1980, (dupl. ex AKU); Mangonui Co., Te Kao, schoolhouse, 1971, R. C. Cooper, AK 129878, det. E. Edgar 1977).

Healy & Edgar (1980) describe this rush and give the first record as Healy (1970). These authors also state that it is "Now known from several localities in North Auckland and almost certainly more widely occurring than present records show".

Acknowledgements. For continued encouragement and help in the preparation of this series I am again indebted to Mr A. E. Wright, Botanist at this Museum. For the acquisition of specimens I am grateful to the staff of the Botany Division, D.S.I.R., Christchurch and to the staff of the Botany Department, University of Auckland. Dr P. J. Brownsey, National Museum, Wellington and Mr A. E. Esler, D.S.I.R., Auckland have also sent specimens as vouchers for some records.

REFERENCES

ALLAN, H. H.

1940 A handbook of the naturalised flora of New Zealand. *N.Z. Dep. Scient. Ind. Res. Bull.* 83: 1-344.

BANGERTER, E. B.

1983 New and interesting records of adventive plants from the Auckland Institute and Museum Herbarium 9. *Rec. Auckland Inst. Mus.* 20: 165-174.

- CHEESEMAN, T. F.
1906 *Manual of the New Zealand flora*. 1st ed. Wellington, Government Printer. 1199p.
- CUNNINGHAM, A.
1838 *Florae Insularum Novae Zealandiae Precursor*. *Ann. Nat. Hist.* 1: 455-462.
- GARNOCK-JONES, P. J.
1979 Checklist of dicotyledons naturalised in New Zealand. 4. Rhoeadales. *N.Z.J.Bot.* 17: 303-310.
1981 Checklist of dicotyledons naturalised in New Zealand. 8. Aizoaceae, Caryophyllaceae and Portulacaceae. *N.Z.J.Bot.* 19: 59-65.
- HEALY, A. J.
1943 Some hitherto unrecorded plant stations. *Trans.Proc.R.Soc.N.Z.* 72: 324-332.
1944 Some additions to the naturalised flora of New Zealand. *Trans.R.Soc.N.Z.* 74: 221-231.
1957 Contributions to a knowledge of the adventive flora of New Zealand, No. 5. *Trans.R.Soc.N.Z.* 84: 649-659.
1958 Contributions to a knowledge of the adventive flora of New Zealand, No. 6. *Trans.R.Soc.N.Z.* 85: 531-549.
1959 Contributions to a knowledge of the adventive flora of New Zealand, No. 8. *Trans.R.Soc.N.Z.* 87: 229-234.
1969 The adventive flora in Canterbury. In *The natural history of Canterbury*. G. A. Knox (Ed.). Wellington, A. H. & A. W. Reed. pp. 261-233.
1970 *Identification of weeds and clovers*. 1st.ed. Wellington, Editorial Services. 191p.
- HEALY, A. J., and E. EDGAR
1980 *Flora of New Zealand* Vol.3. Wellington, Government Printer. 220p.
- RAWLINGS, G. B.
1974 Northland Notes 3. *N.Z.J.Bot.* 12: 563-565.
- MATTHEWS, L. J.
1975 *Weed control by chemical methods*. Wellington, Government Printer. 710p.
- SYKES, W. R.
1978 Checklist of dicotyledons naturalised in New Zealand. 2. Lamiales. *N.Z.J.Bot.* 16: 391-395.
1981 Checklist of dicotyledons naturalised in New Zealand. 11. Apocynales, Campanulales, Ericales, Gentianales, Loganiales, Plantaginales, Primulales and Rubiales. *N.Z.J.Bot.* 20: 319-325.
1982a Checklist of dicotyledons naturalised in New Zealand. 14. Chenopodiales and Polygonales. *N.Z.J.Bot.* 20: 325-331.
1982b Checklist of dicotyledons naturalised in New Zealand. 15. Annonales, Berberidales, Cactales, Fagales, some Geraniales, Juglandales, Laurales, Rutales, Salicales, Sapindales, Tiliales, Nyctaginaceae and Zygophyllaceae. *N.Z.J.Bot.* 20: 333-341.
- THOMSON, G. M.
1875 On some naturalised plants of Otago. *Trans.Proc.N.Z.Inst.* 7: 370-376.
1922 *The naturalisation of animals and plants in New Zealand*. Cambridge, University Press. 670p.
- WEBB, C. J.
1980 Checklist of dicotyledons naturalised in New Zealand. 5. Leguminosae. *N.Z.J.Bot.* 18: 463-472.
1981 Checklist of dicotyledons naturalised in New Zealand. 6. Araliaceae, Buxaceae, Cornaceae, Casuarinaceae, Celastrales, Euphorbiaceae, Linaceae, Malvaceae, Polygalaceae, Urticales. *N.Z.J.Bot.* 19: 45-51.

SPECIMENS OF RARE OR RECENTLY EXTINCT NEW ZEALAND NON-PASSERINE BIRDS IN THE AUCKLAND INSTITUTE AND MUSEUM

B. J. GILL

AUCKLAND INSTITUTE AND MUSEUM

Abstract. Auckland Museum holds 162 specimens of rare or recently extinct New Zealand non-passerine birds. These are enumerated for the benefit of intending users of the collection, and all known collecting data are given for their importance as biological records. Present and past systems of numbering specimens of birds at Auckland Museum are reviewed.

Natural history museums are important not just for the inherently interesting specimens that they keep, but also for the documentation pertaining to these specimens. Registers of museum specimens are valuable biological records particularly for research into historical changes in the distribution of species. From time to time Auckland Museum is asked by researchers to supply lists of the collecting details for specimens of particular species. It therefore seems worthwhile to publish these details for rare and recently extinct species that currently attract great interest. Such a list will serve two purposes: to disseminate important records currently contained in registers, and to indicate to potential users of the collection exactly what specimens of the species listed Auckland Museum holds.

The inventory that follows deals with endangered or recently extinct New Zealand non-passerine birds. Following *The red data book of New Zealand* (Williams & Given 1981) the list is limited to endemic species. Sub-species are not treated. Species listed by Williams & Given (1981) but not given here (Chatham Island Taiko *Pterodroma magentae*, New Zealand Little Bittern *Ixobrychus novaezelandiae*, Auckland Island Merganser *Mergus australis* and Chatham Island Oystercatcher *Haematopus chathamensis*) are not represented in the Auckland Museum collection.

The Chatham Island Rail *Rallus modestus* and New Zealand Quail *Coturnix novaezelandiae* were outside the scope of Williams & Given (1981) but are included here for the interest attached to them, even though the second species may not be endemic to New Zealand.

REGISTRATION OF BIRDS AT AUCKLAND MUSEUM

The oldest surviving register of birds at the Auckland Museum is the "Blue Book", with entries in T. F. Cheeseman's hand. Specimens of New Zealand and foreign vertebrates (except fish) were given simple consecutive numbers (with the suffix "V") and the identity, donor, locality and year of receipt recorded. The register was evidently made in 1898 (the manufacturer's bookplate is dated by hand "20/12/98") and the last year of receipt among the specimens recorded is 1917. However, dates of receipt go back to 1870 showing that records were kept before the register was started, probably only on labels attached to specimens. Cheeseman was appointed in 1874 and there are many entries in the "Blue Book" for specimens that were "In museum 1874 — no history". This suggests that few birds were documented between the founding of the museum in 1852 and Cheeseman's appointment. It is fortunate that Cheeseman had the foresight to begin, at a relatively early period, a system of proper documentation of specimens. Other New Zealand institutions were not so lucky. For example, registration of birds at the National Museum did not begin until 1914 (Gillette & Bartle 1982).

A second register, the "Brown Book", partly replaced the "Blue Book" by listing or relisting specimens of New Zealand mammals and birds (except moas) beginning in taxonomic order and later continuing as specimens were received. Specimens were again assigned simple consecutive numbers. The handwriting is that of L. T. Griffin, Museum Assistant, and later Assistant Curator, from 1908 to 1935. The "Brown Book" was apparently manufactured in 1919, and lists specimens received between 1870 and 1922.

Cheeseman died in office in 1923 and was succeeded as Curator in 1924 by G. Archey. At this time the "Brown Book" was discontinued and a card system for birds (except moas) established. Each species of bird in the collection was given a number with the prefix "AV" (Class Aves). The individual specimens of species 129, for example, were numbered AV129.1, AV129.2, AV129.3, The data for each specimen were duplicated on to a pair of 127 mm by 76 mm (5 inch by 3 inch) cards, with one filed numerically and the other alphabetically by scientific name.

The AV system gradually proved unsatisfactory, mainly because extensive renumbering of specimens was needed to keep abreast of taxonomic changes, a problem compounded when it was decided to number subspecies. The system has now been superseded by a bound register for all new accessions of birds. For various reasons some older specimens have been renumbered. Details in the register are copied on to a 127 x 76 mm card which is filed alphabetically. Specimens receive a simple consecutive number with the prefix "B". In the following list specimens are cited by either an AV or B number.

INVENTORY

***Apteryx owenii* Gould, 1847**

Skins (10). AV1.16, West Coast Sounds (Fiordland), coll. A. J. Jacobs, purch. 1934. AV1.17, ♀, received from W. P. McKenzie 1889. B751, ♂, Kapiti I., coll. 7.VII.1933,

ex. A. C. O'Connor collection. No data, purch. from M. Wigley (♂, juv. ♂, ♀, 2 unsexed). No data (2 ♀♀).

Mounts (22). AV1.1, Westland, received from W. H. Jewell 1881. AV1.3 (♀), AV1.4 (♂), Otago, coll. W. Smyth, received 1890. AV1.12, AV1.13, received from J. S. Brigham 1925. AV1.15, albino, received from A. T. Pycroft. AV1.21, Collingwood (Nelson), coll. W. J. Massey, received 1945. AV1.22, Bruce/Jackson Bay area (Westland), coll. 1873, purch. from M. I. Mueller 1950. Martin's Bay (Otago), coll. before 1896, received from L. Blythe 1966 (8). No data, received from B. Halcombe 1962 (3). Ex. A. Kidd collection of c. 1884, received 1958 (1 juv.). No data (2).

Skeletal Specimens (3). B229, articulated skeleton, Dusky Sound (Fiordland), coll. W. Smyth, received 1885. B687, subfossil bones, subadult, Waikaremoana, coll. 29.VIII.1930. B708, subfossil bones, Karamu (Waikato), coll. R. T. Seccombe 1925.

Eggs (3). B2009, Nelson, coll. 1894. B4018, received 1896-7. B4019, purch. from Mrs Jocelyn.

***Pterodroma axillaris* (Salvin, 1893)**

All specimens are from South East I., Chatham group.

Skins (2). AV1361.2, ♀, coll. C. A. Fleming 21.XII.1937. B736.1, wing only, coll. E. G. Turbott 30.XII.1937.

Skeletal Specimens (3). B84, B88, pectoral bones, coll. E. G. Turbott 19.XII.1937. B736.2, bones, see B736.1.

***Pterodroma pycrofti* Falla, 1933**

Skins (14). AV200.1, paratype, "Cape Maria van Diemen, Mr Rayner, 1896". AV200.2 (holotype, ♂), AV200.3 (paratype, ♀), Hen I., coll. R. A. Falla 27.I.1932. AV200.5, ad. ♀, Marotiri (Chickens) Islands (Hen and Chickens group), coll. E. F. Stead 10.XII.1933. AV200.11 (♀), AV200.12 (♂), AV200.13 (♂), AV200.14 (♀), Hen I., coll. E. F. Stead 26.XI.1933. AV200.16, AV200.17, ad. ♂♂, Hen I., coll. R. A. Falla -I.1937. AV200.18, ad. ♀, Aorangi I. (Poor Knights group), coll. E. G. Turbott 1.XII.1940. AV200.20 (♀), Hen I., coll. R. A. Falla 30.I.1937. AV200.21, Red Mercury I., coll. P. D. G. Skegg 25.XI.1962. AV200.24, juv. ♀, Remuera (Auckland), coll. 24.III.1955.

Mounts (2). AV200.4, ad. ♂, Marotiri Islands, coll. E. F. Stead 10.XII.1933. AV200.15, downy nestling, Hen I., coll. E. G. Turbott 28.I.1937.

Skeletal Specimens (5). B82, B83, skulls, Chickens Islands, coll. R. A. Falla 25.II.1934. B750, bones, Mount Maunganui, coll. A. H. Watson 1950s. B752 (bones), B753 (skull), Mangawhai Beach (Northland), coll. D. Brathwaite 7.III.1953.

Eggs (9). Hen I., coll. E. F. Stead: AV200.6 and AV200.7 (26.XI.1933), B779 (8.XII.1933), B4084 (24.XI.1933). B4085, B4086, Hen I., coll. G. A. Buddle 1.XII.1939. B780, Big Chicken I., coll. -XII.1953. B4087, B4088, Big Chicken I., coll. G. A. Buddle 8.XII.1939.

Coturnix novaezealandiae Quoy & Gaimard, 1830

The taxonomic status of the New Zealand Quail is uncertain. It may be conspecific with the Stubble Quail *C. pectoralis* Gould, 1837 of Australia.

Skins (2). No data (2 relaxed mounts).

Mounts (2). AV58.1, Nelson, coll. Mr St. John, received 1874. No data (1).

Skeletal Specimens (1). B635, subfossil humerus, Red Mercury I., coll. R. B. Sibson 20.XII.1965.

Rallus modestus Hutton, 1872

Mounts (2). AV56.1 (♂), AV56.2 (♀, Mangere I.), Chatham Islands, purch. from Mr Hawkins 1892.

Notornis mantelli Owen, 1848

Skins (1). B2088, sample of body feathers only, Takahe Valley (Fiordland), coll. -I.1959.

Skeletal Specimens (1). B683, subfossil tibiotarsus, Scinde I. (Napier), coll. J. A. Berry 1951.

Thinornis novaeseelandiae (Gmelin, 1789)

Skins (24). AV68.7 (♂), AV68.12 (♀), "Chatham Is. 1894 Danneford". AV68.10, AV68.15, Chatham Islands. AV68.11, relaxed mount, Chatham Islands, coll. S. Dannefaerd, received 1911. Coll. S. Dannefaerd (6 ♂♂, 6 ♀♀). Remaining skins are from South East I., Chatham group. AV68.20 (chick), AV68.23 (ad. ♂), coll. -XII.1937. AV68.21 (ad. ♂), AV68.22 (ad. ♀), coll. 5.XII.1937. AV68.24 (imm. ♀), coll. Dannefaerd, ex. A. C. O'Connor collection. AV68.25 (ad. ♂), coll. 20.XII.1937. AV68.26 (ad. ♀), coll. 19.XII.1937.

Mounts (2). AV68.1, ♂, Chatham Islands, coll. S. Dannefaerd. AV68.18, ♀, coll. S. Dannefaerd.

Eggs (1). B4083, clutch of 3, South East I., coll. 20.XII.1937.

Himantopus novaezealandiae Gould, 1841

Skins (3). AV1140.1, ♀, Mangere (Auckland), coll. W. J. Cheeseman 1.VII.1879. AV1140.2, ♂, Manukau (Auckland), coll. -IX.1882, received from F. H. Combes 1930. AV1140.7, ♂, Mangere, coll. S. M. Reed 21.XI.1976.

Mounts (2). AV1140.3, south head Kaipara Harbour, received from K. A. Snedden 1939. AV1140.6, ad. ♂, Waikato, received from F. H. Combes 1886.

Eggs (3). AV1140.4, clutch of 4, coll. J. C. McLean 1900. AV1140.5, clutch of 4, Tukituki River (Hawke Bay), coll. J. C. McLean 22.XII.1884. B2087, single egg, upper reaches Ahuriri River (Otago), coll. R. J. Nilsson 1.XI.1983.

Cyanoramphus malherbi (Souance, 1857)

The taxonomic status of the Orange-fronted Parakeet is uncertain. It may be a colour variant of the Yellow-crowned Parakeet *C. auriceps* (Kuhl, 1820) — see Nixon (1981).

Skins (2). AV44.5, ad. ♂, Owen Junction (Nelson), coll. A. C. O'Connor 14.VIII.1928 (see Fleming 1980). A second skin is either AV44.1 (Otago, coll. W. Smyth, received 1885) or AV44.2 (Nelson, coll. Mr St. John before 1874).

Mounts (2). AV44.3, Nelson, coll. Mr St. John before 1874. AV44.4, ♀, Otago, received from Otago Museum 1878.

Cyanoramphus unicolor (Lear, 1831)

All specimens are from Antipodes Island.

Skins (4). AV45.3, AV45.4, ad. ♀♀, coll. -.XI.1962. AV45.5, AV45.6, ad. ♀♀, coll. E. G. Turbott 9.XI.1950.

Mounts (2). AV45.1, AV45.2, deposited A. W. Bethune 1902.

Skeletal Specimens (3). B737, B2030 (♂), B2037 (♀), bones, coll. E. G. Turbott -.XI.1950.

Strigops habroptilus Gray, 1845

Skins (10). AV41.11, ♂, Pyke's Creek (Upper Hollyford River, Fiordland), coll. -.IX.1894. AV41.12, ♂, head of Lake McKerrow (Fiordland), coll. -.VIII.1894. AV41.19, West Coast Sounds, coll. A. J. Jacobs, purch. 1934. South I., purch. from M. Wigley (4). No data, Cheeseman collection (1). No data, F. O. Peat collection, deposited 1934 (1). No data, purch. from Newton Hotel 1945 (1).

Mounts (12). AV41.2, AV41.3, AV41.4, Dusky Sound, coll. A. Reischek, received 1884. AV41.6, ♂, Milford Sound, received from Sir George Grey 1882. AV41.13, AV41.14, received from J. S. Brigham 1925. AV41.21, yellow mutant, Jackson Bay (Westland), coll. G. Mueller (mentioned by Buller 1888: 178). Martin's Bay (Otago), coll. before 1896, received from L. Blythe 1966 (2). No data, purch. from M. I. Mueller 1950 (1). No data, received from B. Halcombe 1962 (1). No data (1).

Skeletal Specimens (9). AV41.1 (received 1881), B299 (received 1884), articulated skeletons, Dusky Sound, coll. A. Reischek. Subfossil bones: B4, Hamilton, coll. J. Hobson. B5, Karamu (Waikato), received from R. T. Seccombe 1925. B6, South Fiord (Lake Te Anau), coll. G. Maire, received 1962. B539, Karamu (Waikato), coll. J. Pybus 21.XI.1953. B680, Doubtless Bay (Northland), coll. G. Archey 1940. B684, Waikaremoana, coll. 1930. B749, Frankton (Waikato), coll. R. T. Seccombe.

Sceloglaux albifacies (Gray, 1844)

Mounts (1). B748, limestone cliffs near Pleasant Point (Canterbury), coll. T. H. Potts, received 1903.

Acknowledgements. I thank Graham Turbott for helpful discussion, particularly of the history of registration at Auckland Museum, and Sir Charles Fleming (who presented several of the listed specimens) for comments on a draft.

REFERENCES

- BULLER, W. L.
1888 *A history of the birds of New Zealand*. 2nd. ed. Vol. 1. London, privately published. 250p.
- FLEMING, C. A.
1980 Orange-fronted parakeet: record of flocking. *Notornis* 27: 388-390.
- GILLETTE, J., and J. A. BARTLE
1982 Catalogue of anatomical specimens of living or recently extinct birds in the National Museum of New Zealand (NMNZ). *Nat.Mus.N.Z.Misc.Ser.* 5: 1-18.
- NIXON, A. J.
1981 The external morphology and taxonomic status of the orange-fronted parakeet. *Notornis* 28: 292-300.
- WILLIAMS, G. R., and D. R. GIVEN
1981 *The red data book of New Zealand*. Wellington, Nature Conservation Council. 175p.

NEW SPECIES OF INTERTIDAL MESOSTIGMATA (ACARI) FROM NEW ZEALAND

MALCOLM LUXTON

LIVERPOOL POLYTECHNIC, LIVERPOOL, ENGLAND

Abstract. *Dendrolaelaps (Pontiolaelaps) crenatus*, *D. (P.) terebratus* subgen. nov., spp. nov., and *Leioseius australis* sp. nov., are described. All species occur on barnacle-encrusted rocks on the north-east coast of the North Island, New Zealand.

The free-living Mesostigmata of the rocky shore are all carnivorous, probably feeding on other mites, springtails and small crustaceans. They inhabit crevices, either in the rock substrate or between barnacle carapaces, and are distributed throughout the littoral. The various species, however, usually display discrete distribution patterns.

Six species from the New Zealand subregion are known to be confined to littoral habitats, all are recorded from rocky shores, and all are members of the family Rhodacaridae (Luxton 1967, 1968; Lee & Hunter 1974). They are: *Hydrogamasus kensleri* Luxton, 1967 (New Zealand, North Island, and Macquarie Island), *Parasitiphis aurora* Lee, 1970 (New Zealand, South Island, Campbell Island, Macquarie Island), *Parasitiphis jeanneli* Andre, 1947 (New Zealand, South Island, Auckland Island, Macquarie Island), *Litogamasus setosus* (Kramer, 1898) (Campbell Island), and *Litogamasus falcipes* Lee & Hunter, 1974 (Campbell Island, Auckland Island). The three species described in this present paper bring the number to nine, in three families.

Family DIGAMASELLIDAE Evans, 1957

Genus *Dendrolaelaps* Halbert, 1915

Pontiolaelaps subgen. nov.

Dorsum with two more-or-less subequal shields in female, anterior dorsal shield considerably longer than posterior dorsal shield in male. No sclerotic nodules between setae z5; setae z3 present; setae j2 situated posterior to z1 and j1; r-marginal setae usually on dorsal shield although r4 may sometimes be on lateral interscutal membrane. Anterior dorsal shield in both sexes depressed anteriorly from a line more-or-less joining setae s1 and j2. Anterior margin of posterior dorsal shield entire, posterior edge considerably toothed; setae R1 on striated lateral membrane; setae S5 and Z5 long and spatulate, S5 longer than Z5. Ventro-anal shield fused posteriorly with posterior dorsal shield in male but free in female; para-anal setae (Jv4) anterior to anal opening; only setae Jv2, Jv3, Jv4 and Zv2 on ventro-anal shield. Metasternal

setae of female situated on sternometasternal shield; endopodal shields of coxae III and IV free on membrane in female and fused to sternal shield only at their anterior extremity in male. One pair of genital setae. Five or six rows of deutosternal denticles, basalmost row the widest otherwise file of equal width throughout. Palp apotele 2-tined. Moveable digit of female chelicera multidentate. Tibia I with 3 ventral, 2 antero-lateral, and 5 dorsal setae; femur II with 11 setae; trochanter III with 5 setae; genu IV with 4 dorsal setae. Leg II of male spurred. Basitarsi II to IV each with 4 setae. Bidactylous; pretarsus, claws and pulvilli of leg I reduced; pair of pulvilli originating between claws with another skirt-like pulvillus originating dorsally at base of pretarsus of legs II, III and IV. Spermatheca of female opening between coxae III and IV.

Remarks. The subgenus described belongs to the family Digamasellidae but cannot confidently be assigned to any accepted genus within it. It is closest to genus *Dendrolaelaps sensu lato* as defined by Lindquist (1975), although it does not possess scleronoduli between setae Z5. In the works of Hirschmann (1974) and Hirschmann & Wisniewski (1982) it keys to subgenus *Multidendrolaelaps* of *Dendrolaelaps*, principally because of the multidentate mobile digit of the chelicera. However, it differs from the forms assigned to this subgenus in the following significant ways: (1) scleronoduli are absent, (2) setae Z5 and S5 are spatulate, (3) the posterior margin of the notogaster is crenate, (4) the integument between the lateral setae is striated.

A number of the characteristics of the New Zealand subgenus may be found in some species of a heterogeneous assemblage known by Hirschmann & Wisniewski (1982) as "fragliche *Dendrolaelaps*-arten". Significantly, the four species in question (*D. watsoni*, *D. schusteri*, *D. kargi*, *D. templei*) are all from the sub-Antarctic region (the first three from Macquarie Island, the fourth from Heard Island). Individually they may resemble the New Zealand subgenus in certain important ways. For example, none possess scleronoduli (although the male of *D. watsoni* is illustrated with them in Hirschmann 1966), *D. watsoni* and *D. schusteri* have a crenate posterior border to the notogaster, and the Z5 setae are spatulate in *D. templei*. On the other hand, they have insufficient characters in common to unite them into a single supraspecific taxon.

The two species described from New Zealand appear to represent a small aberrant offshoot from the main digamasellid stream with certain significant characters unique to them. These differences require recognition, which is why a new subgenus has been erected, but the similarities are also noted in assigning the new subgenus to a somewhat widened concept of the genus *Dendrolaelaps*. It may be necessary, when more material is discovered and described from this region, to elevate the subgenus to full generic status.

***Dendrolaelaps* (*Pontiolaelaps*) *crenatus* sp. n.**

(Figs. 1-13)

FEMALE

Dimensions: Average length of anterior dorsal shield ($n = 2$) 358 μm (345 and 370); average length of posterior dorsal shield 335 μm (320 and 350); average overall length 693 μm ; average width at widest point 375 μm (365 and 390).

Gnathosoma: Tectum 3-pronged, median prong narrow and notched at tip, lateral prongs serrate on outer edges. Palp apotele 2-tined. One female with 6 rows of deutosternal denticles, one other and males with 5; basalmost row of denticles the widest, otherwise file of even width throughout; number of teeth per file from anterior-most: 6,12,10,12,24. Chelicerae multidentate, the moveable digit with 9 backwardly facing teeth, the posteriormost being the largest; fixed digit with 5 or 6 teeth. Corniculi horn-like.

Dorsum: Dorsal shield divided; anterior dorsal shield with 22 pairs of setae, posterior dorsal shield with 19 pairs of setae. Both shields coarsely punctate with some areolar areas smooth or finely punctate; both shields somewhat reticulated at their antero-lateral corners; no refractive sclerotic nodules between setae z5; antero-dorsal shield fused with peritrematal shield anteriorly to level of seta r2. Peritrematal shield extending from level of coxa IV almost to seta z1. Posterior dorsal shield with setae S5 and Z5 much enlarged and spatulate, both on tubercles; setae S5 somewhat larger than Z5 and with a pore anterior to its base. Setae J5 somewhat setose, all other dorsal setae robust, smooth and pointed. Posterior edge of posterior dorsal shield strongly denticulate. Setae R1 on striated lateral membrane.

Venter: Ventro-anal shield irregular in outline; aciculae posterior to anal opening well developed; bearing 9 setae, the para-anals anterior to anal opening. Shield more coarsely punctate posteriorly and reticulated. Two pairs of setae (Zv1 and Jv1) on striated membrane between genital and ventro-anal shields; setae Zv3 and Jv5 on membrane lateral to ventro-anal shield. Two small, finely punctate patches in striated integument laterally to ventro-anal shield, another at posterior corners of genital shield. Laterally in striated integument of venter are 2 further pairs of larger, elongate, finely punctate patches, the anteriormost carrying a conspicuous pore. Genital shield wedge-shaped, bearing 1 pair of setae and punctations, the lateral ones appearing elongate. Four pairs of sternal setae, st1 on punctate membrane, st4 on posterior corners of shield. Sternal shield finely punctate, with some reticulation laterally. One pair of elongate pores on anterior edge of shield and a second pair postero-lateral to seta s2. Endopodal shields of legs III and IV free on membrane. No presternal or metasternal shields. Spermatheca surfaces between coxa III and IV.

Legs: Bidactylous, claws of leg I relatively less robust than those of other legs. Many leg setae spine-like. Leg chaetotaxy (ventral, lateral, dorsal): Tibia I 3-4-5, II 2-3-5, III 2-2-4, IV 2-2-3; Genu I 3-4-5, II 2-3-6, III 2-2-5, IV 1-2-4; Femur I 5-2-6, II 4-2-5, III 1-2-3, IV 2-1-3; Trochanter I 3-1-2, II 3-2-0, III 3-1-1, IV 3-1-1; Coxa I 2-0-0, II 2-0-0, III 2-0-0, IV 1-0-0. Pulvilli comprising a narrow and pointed pair originating between claws and a skirt-like pulvillus arising dorso-proximally from pretarsus.

MALE

Dimensions: Average length of anterior dorsal shield ($n = 2$) 365 μm (370 and 360); average length of posterior dorsal shield 290 μm ; average overall length 655 μm ; average width at widest point 450 μm (460 and 440).

Gnathosoma: Tectum similar to that of female but with a more strongly arched median curve. Moveable digit of chelicera with a single backward pointing tooth; spermatophoral organ straight and blunt, subequal to moveable digit. Fixed digit of chelicera with 3 teeth.

Dorsum: Anterior dorsal shield with many more areoles than that of female; posterior dorsal shield with 2 more pairs of pores than female. Ridge connecting setae j2; anterior dorsal shield connected to peritrematal shield to level of seta r3.

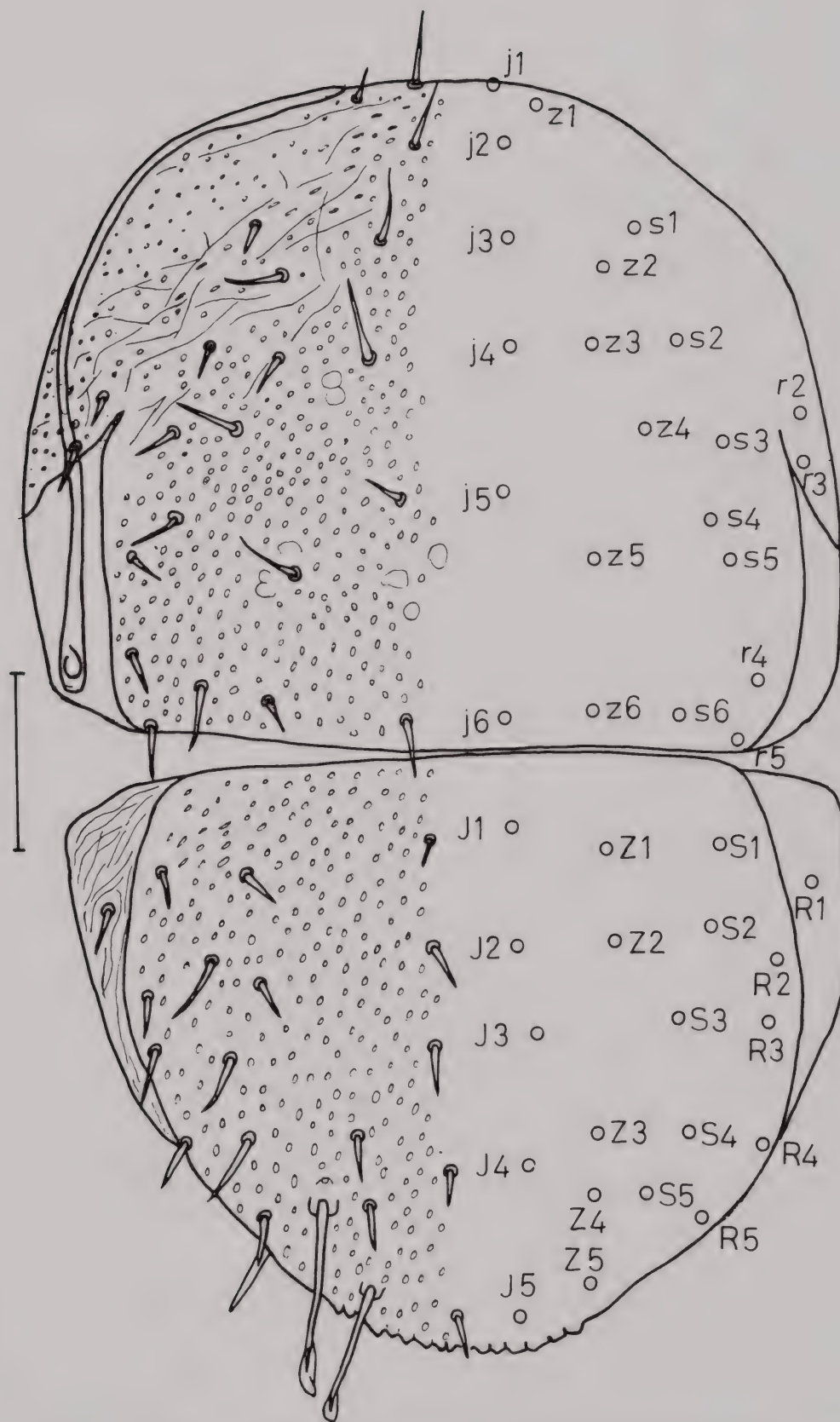


Fig. 1. *Dendrolaelaps (Pontiolaelaps) crenatus*, female. Dorsal view. Scale represents 50 μm .

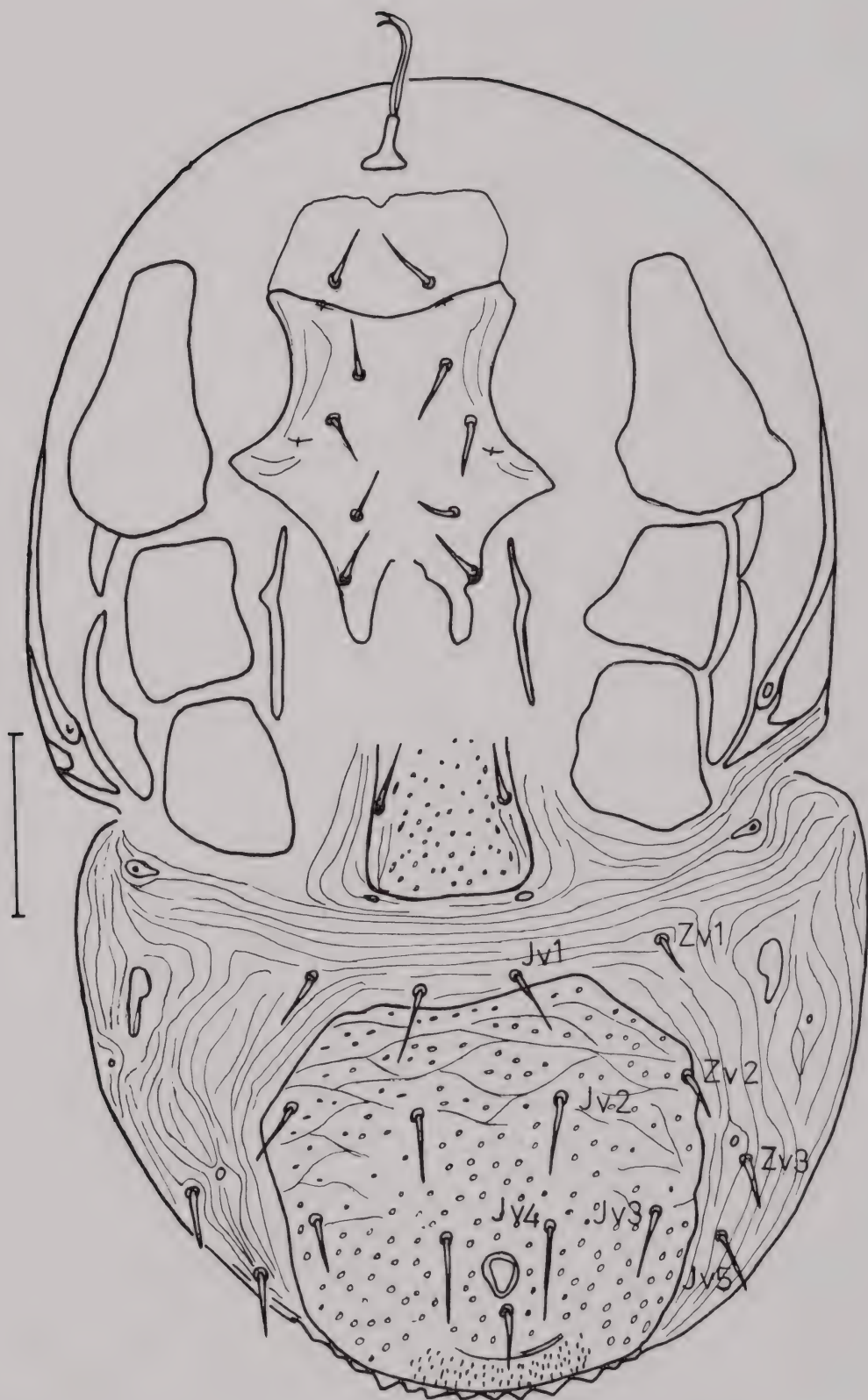


Fig. 2. *Dendrolaelaps (Pontiolaelaps) crenatus*, female. Ventral view. Scale represents 50 μm .

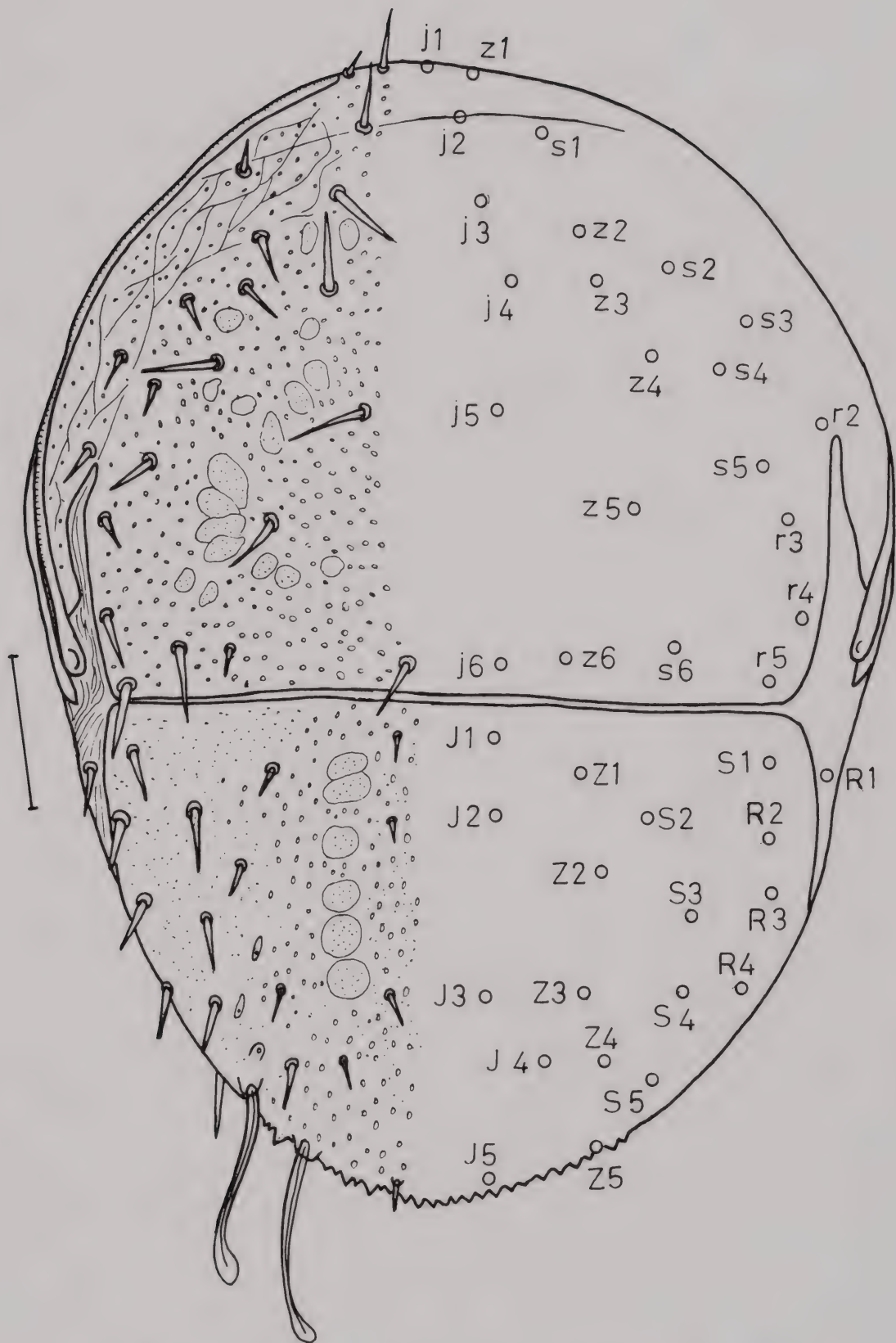
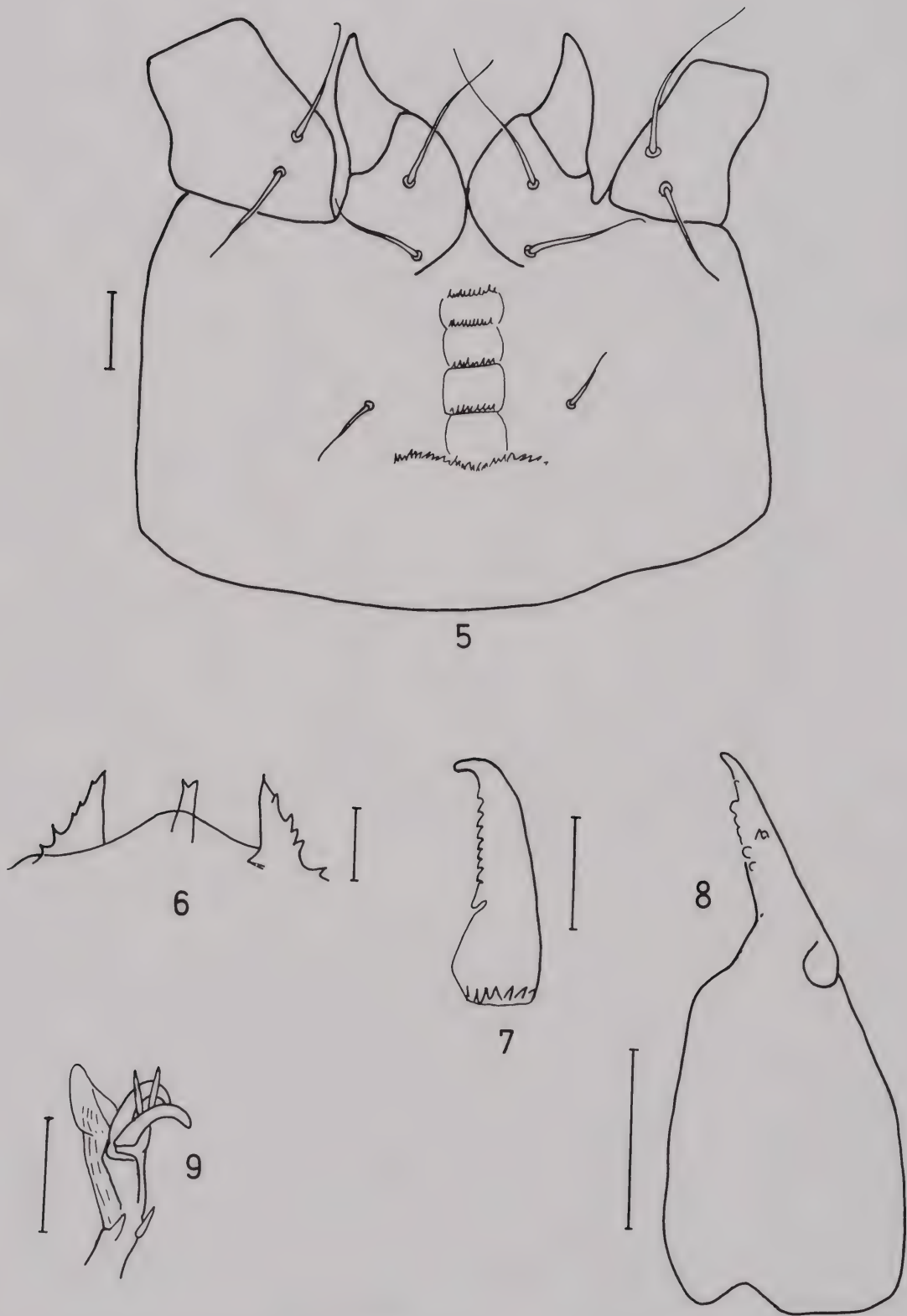


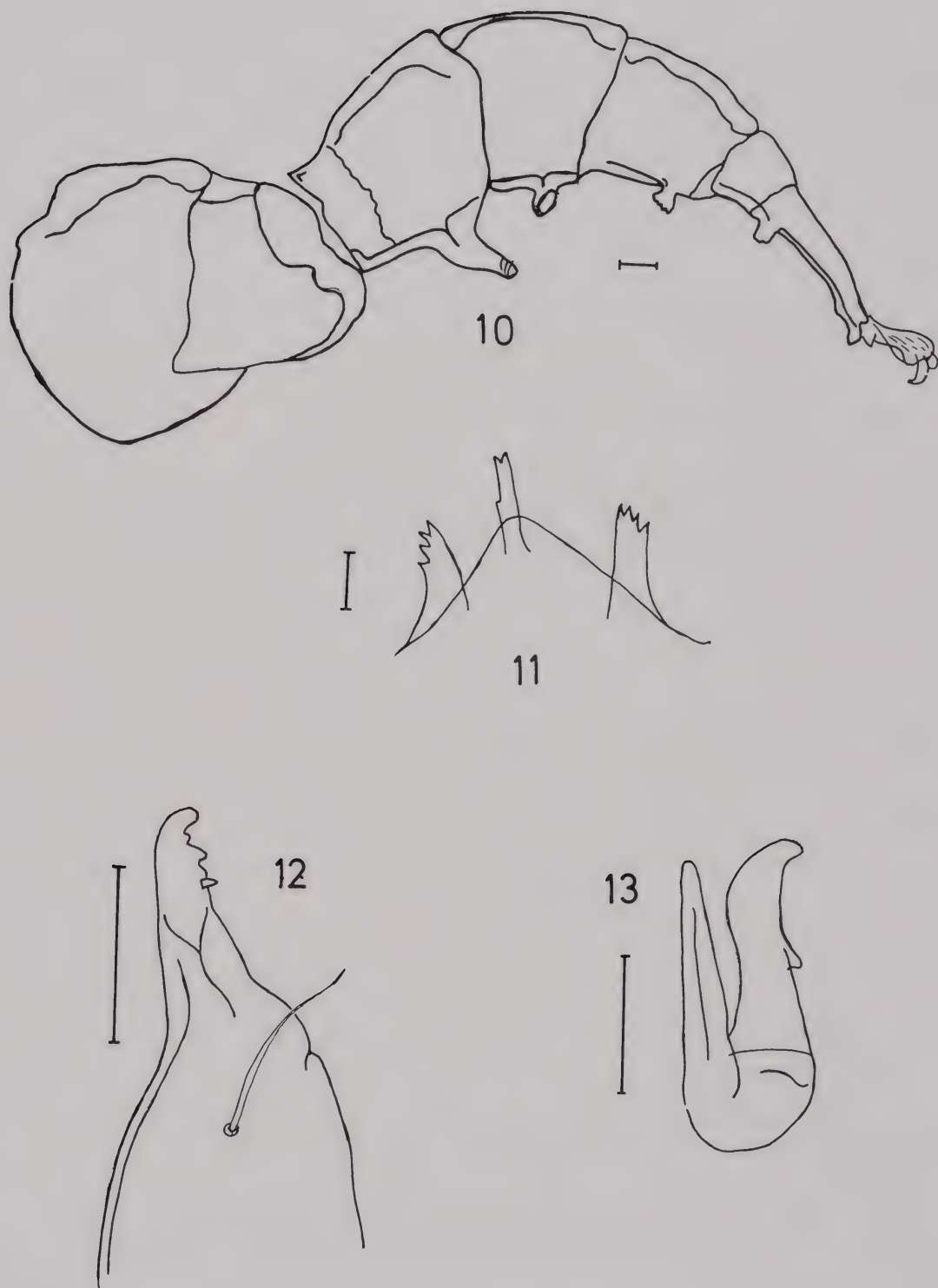
Fig. 3. *Dendrolaelaps (Pontiolaelaps) crenatus*, male. Ventral view. Scale represents 50 μm .



Fig. 4. *Dendrolaelaps (Pontiolaelaps) crenatus*, male. Ventral view. Scale represents 50 μm .



Figs. 5-9. *Dendrolaelaps (Pontiolaelaps) crenatus*. 5. Female. Deutosternum. Scale = 20 μm . 6. Female. Tectum. Scale = 20 μm . 7. Female. Moveable digit of chelicera. Scale = 20 μm . 8. Female. Fixed digit of chelicera. Scale = 20 μm . 9. Claws and pulvillus. Scale = 20 μm .



Figs. 10-13. *Dendrolaelaps (Pontiolaelaps) crenatus*. 10. Male. Leg 11. Scale = 20 μm .
 11. Male. Tectum. Scale = 20 μm . 12. Male. Fixed digit of chelicera. Scale = 20 μm .
 13. Male. Moveable digit of chelicera with spermatophoral organ. Scale = 20 μm .

Venter: Sternal shield fused to endopodals anteriorly from level of setae st4. Setae st1 in punctate membrane anterior to sternal shield proper; male opening also in this region. Ventro-anal shield extremely irregular, coarsely punctate, bearing 15 or 16 setae (Zv3 present on one side only in both males). Genital setae on separate triangular plates.

TYPE LOCALITY. Intertidal zone, sheltered rock platform, Omaha Cove, Leigh, North Auckland, 5.XII.1968, coll. K. A. J. Wise.

Type specimens. Holotype female and paratype male at the Auckland Museum, Auckland, New Zealand.

***Dendrolaelaps (Pontiolaelaps) terebratus* sp. n.**

(Figs. 14-18)

FEMALE

Dimensions: Average length of anterior dorsal shield ($n = 3$) 288 μm (range 275-310); average length of posterior dorsal shield 293 μm (range 280-310); average overall length 582 μm ; average width at widest point 340 μm (range 330-350).

Gnathosoma: Typical for genus. Five rows of deutosternal denticles, the basalmost the widest and arranged in 2 anteriorly directed curves. Moveable digit of chelicera with 6 backwardly directed teeth.

Dorsum: Typical for genus. Setae of anterior dorsal shield relatively more massive than in *D. (P.) crenatus* while J setae of female are relatively much smaller. Some setae of J and Z series may be somewhat setose (especially J5, J4 and Z4).

Venter: Ventro-anal shield regular in outline and heavily reticulated anteriorly, otherwise venter typical for genus.

Legs: Typical for genus. Pulvilli between claws less well defined than in *D. (P.) crenatus*.

MALE

Not known.

TYPE LOCALITY. Among *Elminius* sp. on rock, exposed rock platform, opposite Goat Island, Leigh, North Auckland, 5.XII.1968, coll. K. A. J. Wise.

Type specimens. Holotype female at the Auckland Museum, Auckland, New Zealand; paratype female at the British Museum (Natural History), London.

Remarks. *Dendrolaelaps (Pontiolaelaps) terebratus* is readily distinguished from *D. (P.) crenatus* by its smaller size, by the massive peg-like setae on the anterior dorsal shield, and by the greater extent of reticulation on the more regular shaped ventro-anal shield.

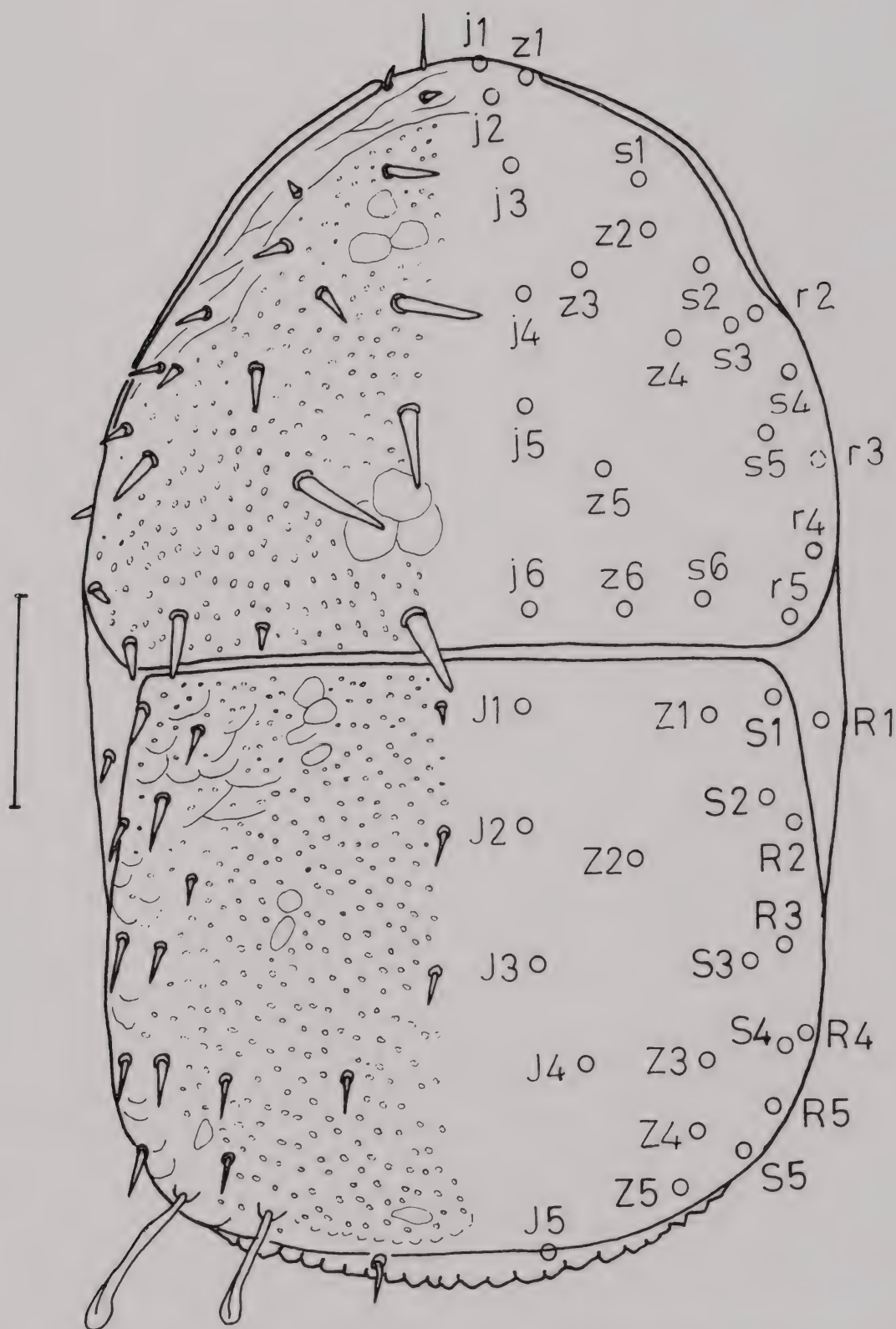


Fig. 14. *Dendrolaelaps (Pontiolaelaps) terebratus*, female. Dorsal view. Scale represents 50 μm .

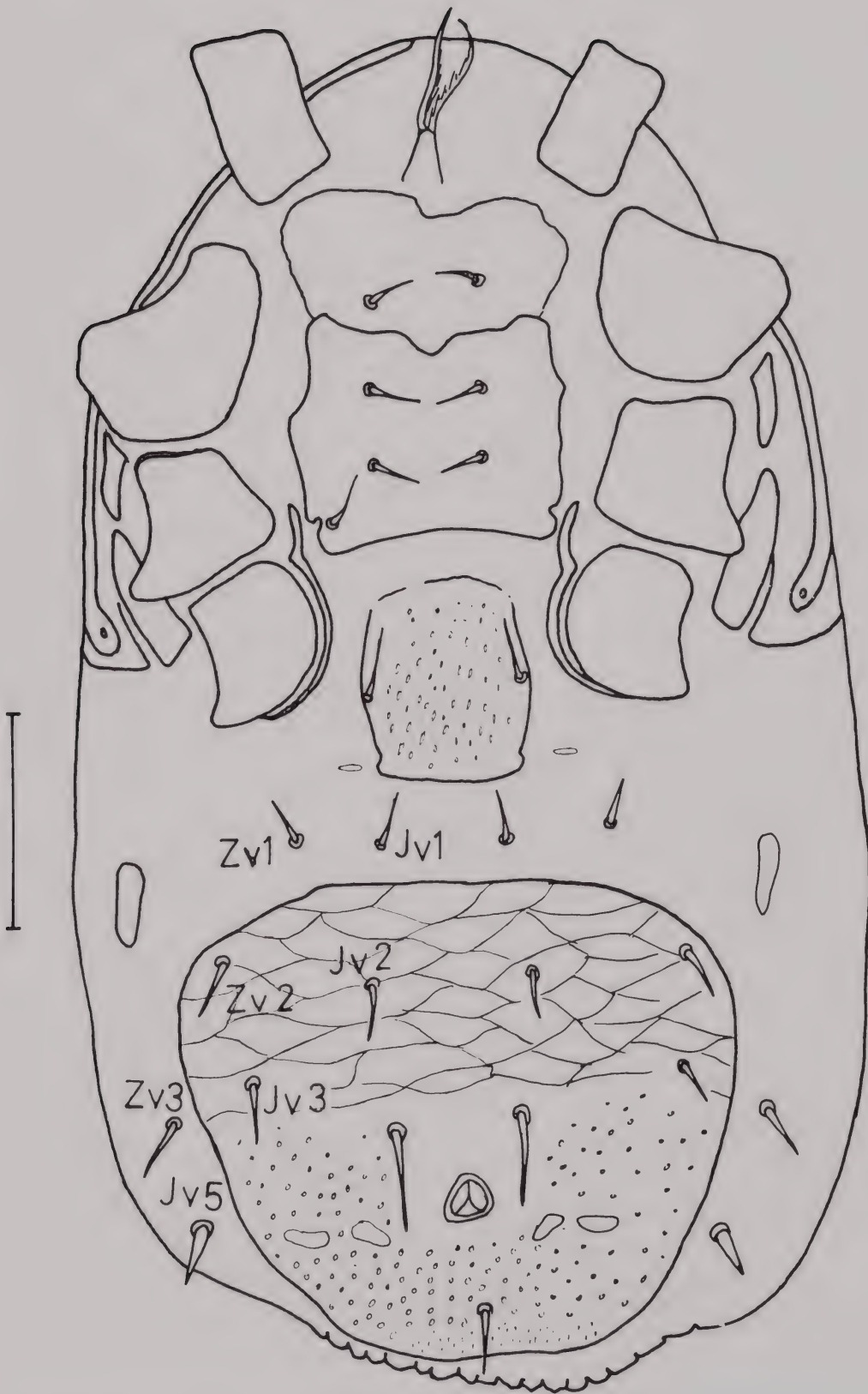
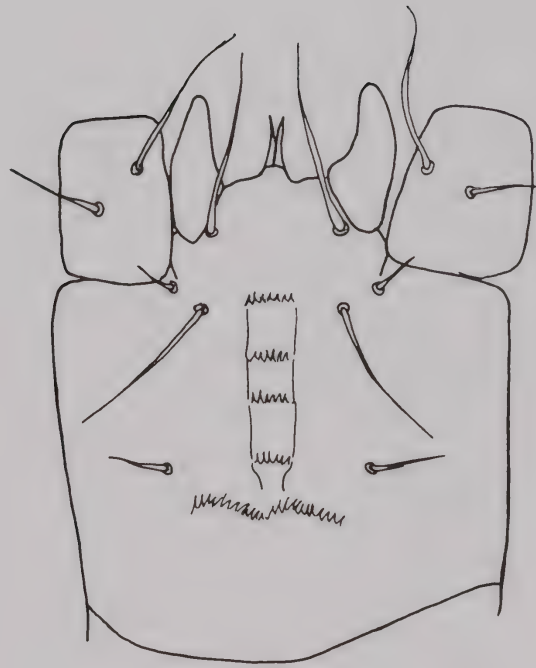


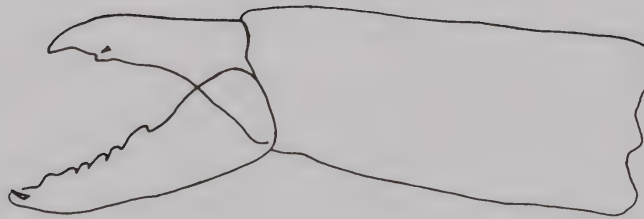
Fig. 15. *Dendrolaelaps (Pontiolaelaps) terebratus*, female. Ventral view. Scale represents 50 μm .



16



17



18



Figs. 16-18. *Dendrolaelaps (Pontiolaelaps) terebratus*. 16. Female. Deutosternum. Scale = 10 μm . 17. Female. Tectum. Scale = 10 μm . 18. Female, Chelicera. Scale = 10 μm .

Family ASCIDAE Voigts & Oudemans, 1905

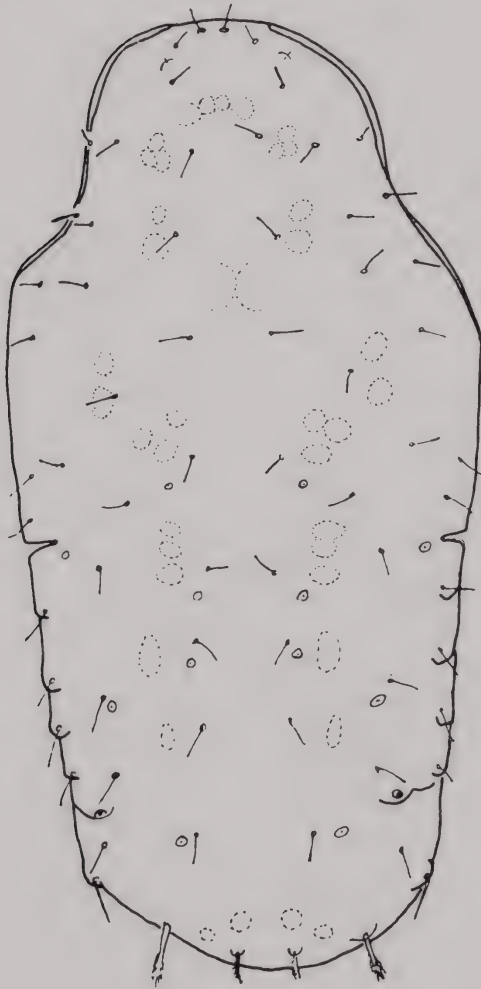
Genus *Leioseius* Berlese, 1916

Leioseius australis sp. n.

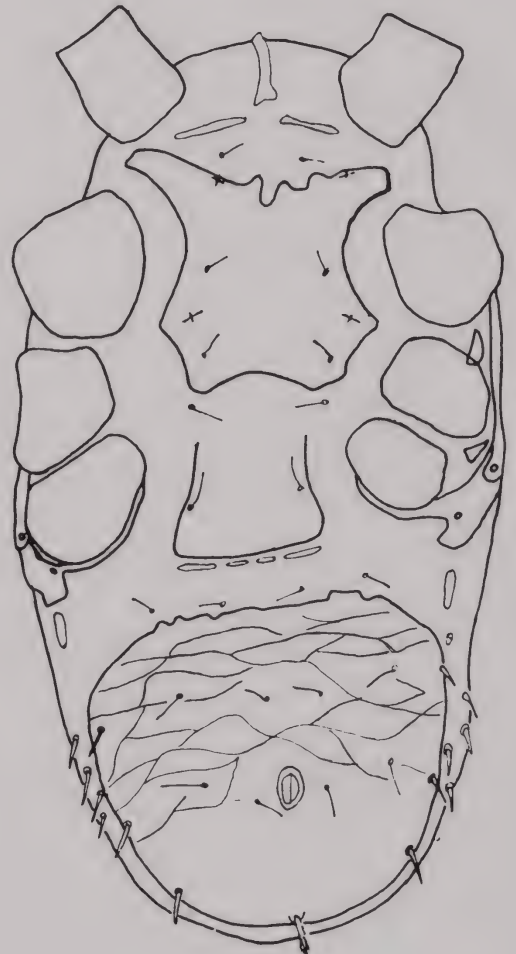
(Figs. 19-27)

FEMALE

Dimensions: Average length (n=2) 393 μm (390 and 395); average width at level of dorsal shield incisions 180 μm .



19

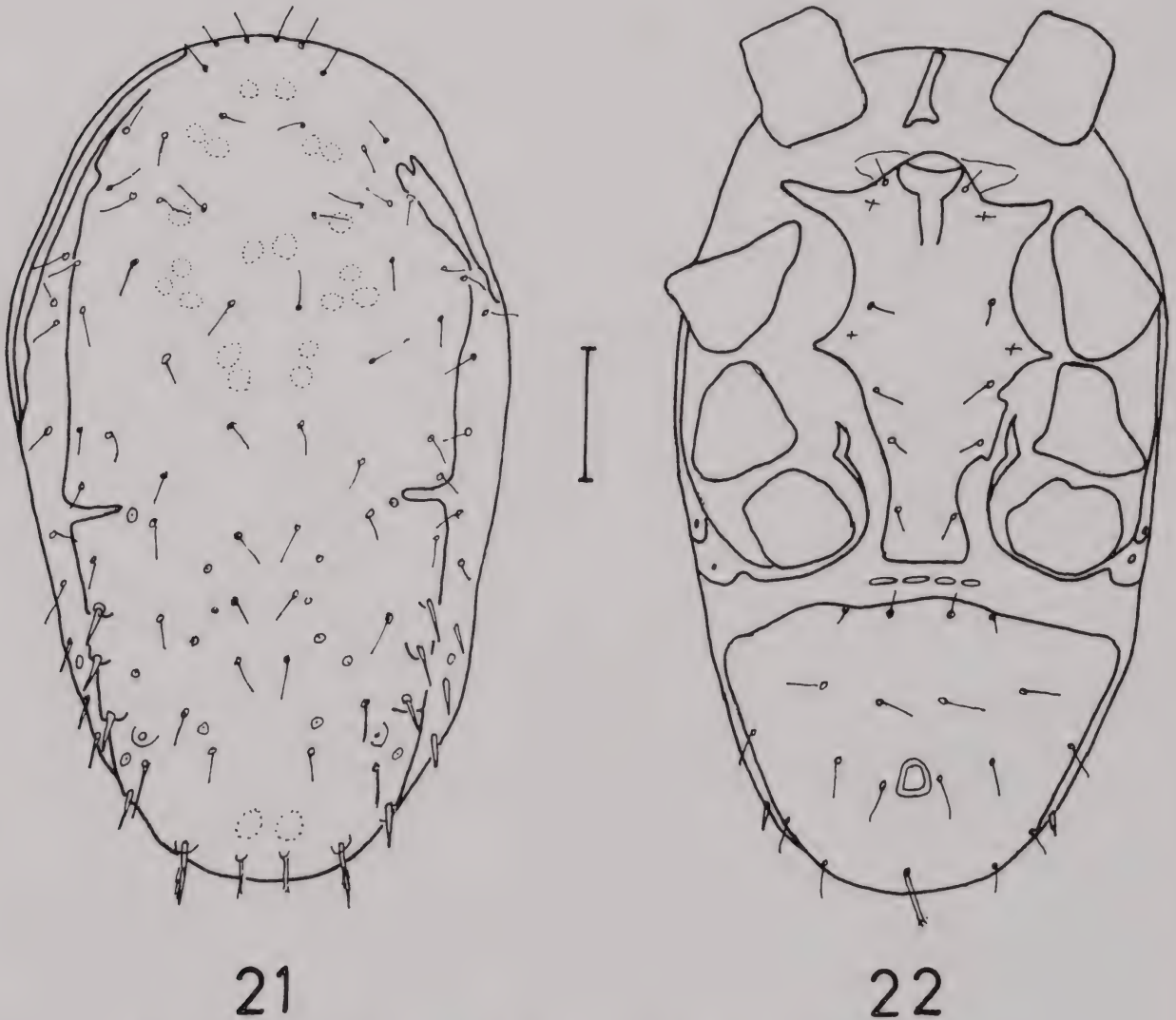


20

Figs. 19-20. *Leioseius australis*. 19. Female. Dorsal view. Scale represents 50 μm . 20. Female. Ventral view. Scale represents 50 μm .

Gnathosoma: Tectum 3-pronged with teeth more-or-less well developed. Palp apotele 2-tined. Eight or 9 rows of denticles in a narrow file and weakly developed. Moveable digit of chelicera with 2 teeth. Corniculi horn-like.

Dorsum: Dorsal shield with lateral incisions; anterior dorsal shield with 19 pairs of setae and with 4 pairs on the lateral membrane; posterior dorsal shield with 15 pairs of setae and with 6 pairs on the lateral membrane. Numbers of setae on anterior dorsal shield may vary between specimens since some setae (in particular s2, r5) may be either on shield or on lateral membrane. Both shields finely punctate with some large specialised punctations on posterior dorsal shield distributed as in Fig. 19.



Figs. 21-22. *Leioseius australis*. 21. Male. Dorsal view. Scale represents 50 μm . 22. Male. Ventral view. Scale represents 50 μm .

Anterior dorsal shield without these specialised punctations but with many faintly discernible areoles. Posterior dorsal shield somewhat scabrous on lateral edges with S setae being particularly robust and on elevations of the integument. Anterior dorsal shield fused with peritrematal shield anterior to seta s1. Peritrematal shield extending from coxa IV almost to seta j2. Setae J5 and Z5 somewhat setose. Most dorsal setae smooth, narrow and pointed.

Venter: Ventro-anal shield regular in outline except for anterior edge which is irregular; zone anterior to anal opening reticulated; para-anal setae closer to posterior edge of anal opening, post-anal seta somewhat setose and distant from anal opening; 5 other pairs of setae present on this plate making 15 setae in total. One thorn-like ventro-lateral seta adjacent to edge of ventro-anal plate; two pairs of ventral setae between ventro-anal and genital plates, together with 2 pairs of small, narrow accessory plates. A further elongate punctate area situated in ventral membrane below peritrematal area. Peritrematal plate extending below coxa IV, fused with endopodal plate and bearing a small pore. Genital shield truncate, with one pair of setae. Sternal shields not fused to endopodal shields, anterior edge irregular, and bearing only 2 setae; st1 presternal, st4 poststernal. Tritosternum base narrow and elongate. Spermatheca surfaces on coxa III.

Legs: Bidactylous, claws of leg I relatively less robust than those of other legs. Leg chaetotaxy (ventral, lateral, dorsal): Tibia I 2-4-6, II 2-4-4, III 2-3-3, IV 2-4-4; Genu I 2-4-6, II 2-4-5, III 2-3-4, IV 1-3-5; Femur I 4-3-5, II 3-4-4, III 1-2-3, IV 2-1-3; Trochanter I 3-2-1, II 3-2-0, III 3-1-1, IV 3-1-1; Coxa I 2-0-0, II 2-0-0, III 2-0-0, IV 1-0-0.

MALE

Dimensions: Average length ($n = 3$) 325 μm ; average width at level of dorsal shield incisions 145 μm (140-150).

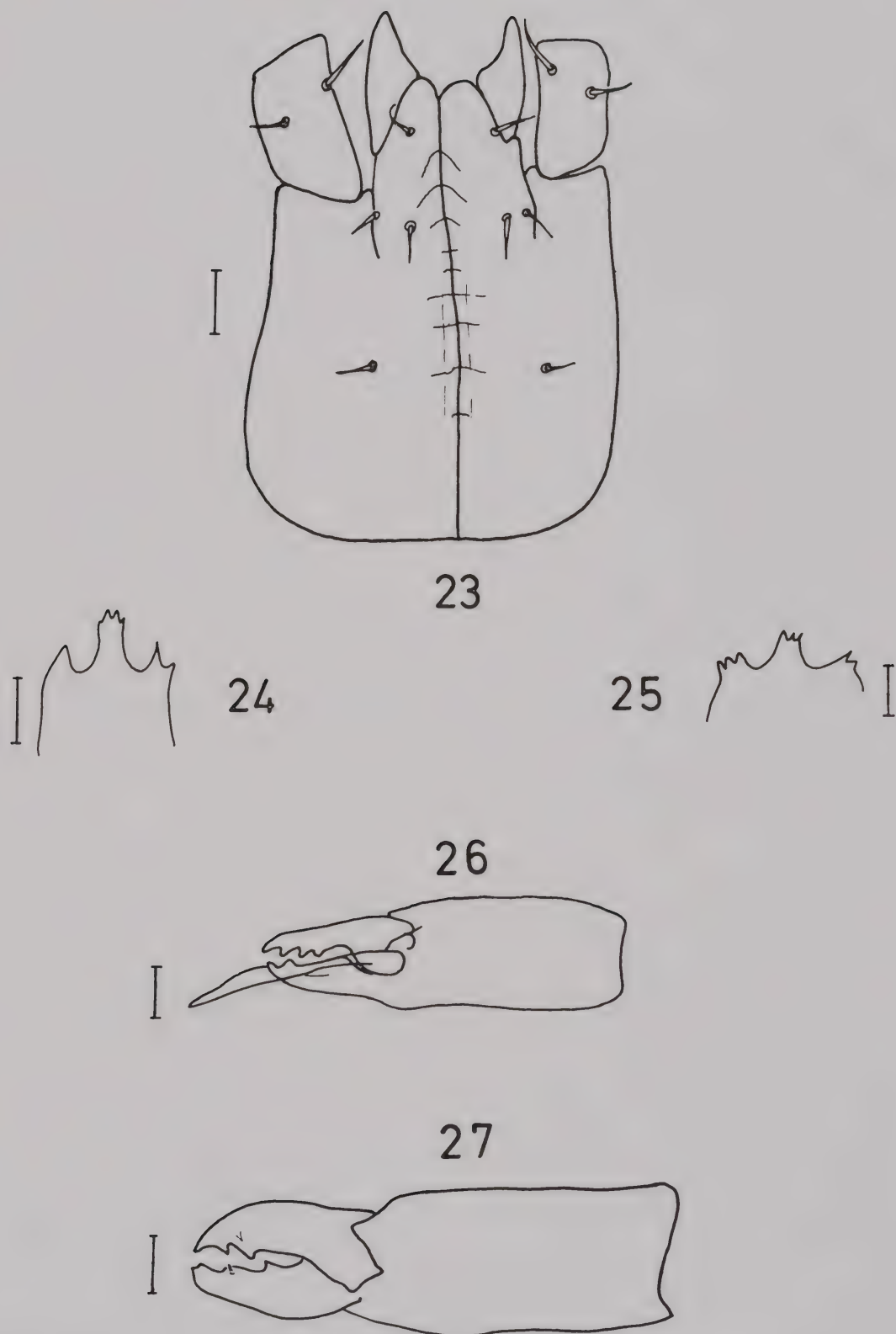
Gnathosoma: Tectum similar to that of female, teeth perhaps more apparent. Moveable digit of chelicera with 3 teeth; spermatophoral organ straight and smooth; fixed digit of chelicera with a single tooth.

Dorsum: Essentially similar to that of female. Anterodorsal shield occasionally with an extra seta (19 or 20 pairs); 4 or 5 setae on lateral membrane. Posterodorsal shield with 15 pairs of setae; five pairs on lateral membrane.

Venter: Ventro-anal shield fused to posterodorsal shield posteriorly and bearing 19 setae. One pair of setae on membrane lateral to ventro-anal shield. Two pairs of plates in membrane between ventro-anal and sterno-genital shield. Sterno-genital shield with 5 pairs of setae, male opening on anterior edge. Endopodal shields of coxae III and IV free on membrane. Peritrematal shield fused with endopodal shield of coxa IV. Spermatheca surfacing at coxa III.

TYPE LOCALITY. From barnacles (*Elminius*) on rock, exposed rock platform opposite Goat Island, Leigh, North Auckland, 5.XII.1968, coll. K. A. J. Wise; from barnacles (*Chamaesipho*) on rock, exposed rock platform, opposite Goat Island, Leigh, North Auckland, 5.XII.1968, coll. K. A. J. Wise.

Type specimens. Holotype female and paratype male at the Auckland Museum, Auckland, New Zealand; paratype female and paratype male at the British Museum (Natural History), London.



Figs. 23-27. *Leioseius australis*. 23. Deutosternum. Scale = 10 μm . 24. Female tectum. Scale = 10 μm . 25. Male tectum. Scale = 10 μm . 26. Male chelicera. Scale = 10 μm . 27. Female chelicera. Scale = 10 μm .

Remarks. The new species accords with Lindquist & Evans' (1965) definition of genus *Leioseius* in all respects except that it possesses 12, rather than 13, setae on genua and tibiae I. It is proposed to widen the definition to accommodate this difference rather than to erect a new supraspecific taxon.

Acknowledgements. I am most grateful to K. A. J. Wise, Auckland Institute and Museum, for allowing me to work on this material.

REFERENCES

- HIRSCHMANN, W.
 1966 Gänge von Litoralmilben und neue Litoralmilbenarten. *Acarologie* 9, Gangsystematik der Parasitiformes 15: 25-44.
 1974 Die Gattung *Dendrolaelaps* Halbert 1915 Hirschmann nov. comb. Nova Subgenera *Multidendrolaelaps*, *Tridendrolaelaps* Hirschmann. Studien von 4 neuen *Dendrolaelaps*-arten. *Acarologie* 20, Gangsystematik der Parasitiformes 190: 50-70.
- HIRSCHMANN, W., and J. WISNIEWSKI
 1982 Weltweite Revision der Gattungen *Dendrolaelaps* Halbert 1915 und *Longoseius* Chant 1961. *Acarologie* 29, I: 1-190, II: 1-48.
- LEE, D. C., and P. E. HUNTER
 1974 Arthropoda of the subantarctic islands of New Zealand. 6. Rhodacaridae. *N.Z.J.Zool.* 1(3): 295-328.
- LINDQUIST, E. E.
 1975 *Digamasellus* Berlese, 1905, and *Dendrolaelaps* Halbert, 1915, with descriptions of new taxa of Digamasellidae. *Can.Ent.* 107(1): 1-43.
- LINDQUIST, E. E., and G. O. EVANS
 1965 Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina. *Mem.Ent.Soc.Canada* 47: 1-64.
- LUXTON, M.
 1967 Two new mites from the rocky shore of North Auckland. *N.Z.J.Mar.Freshwat.Res.* 1(1): 76-87.
 1968 A new genus and species of littoral mite from New Zealand. *N.Z.J.Mar.Freshwat.Res.* 2(3): 497-504.

INDEX TO VOLUME 21

| | |
|--|----|
| <i>Acacia mearnsii</i> | 73 |
| Acari | 83 |
| Adventive plants | 69 |
| <i>Apteryx owenii</i> | 78 |
| Bangerter, E. B. | |
| New and interesting records of adventive plants from the Auckland Institute and Museum | |
| Herbarium. 10 | 69 |
| <i>Berberis vulgaris</i> | 69 |
| Bowls | 51 |
| <i>Brassica barrellieri</i> subsp. <i>oxyrrhina</i> | 70 |
| <i>Calendula arvensis</i> | 73 |
| <i>Campanula rapunculoides</i> | 74 |
| <i>Cerastium semidecandrum</i> | 71 |
| <i>Chasmanthe bicolor</i> | 75 |
| <i>Chenopodium erosum</i> | 72 |
| <i>Citrullus lanatus</i> | 72 |
| <i>Coturnix novaezelandiae</i> | 80 |
| <i>Cyanoramphus malherbi</i> | 81 |
| <i>Cyanoramphus unicolor</i> | 81 |
| <i>Dendrolaelaps (Pontiolaelaps) crenatus</i> | 84 |
| <i>Dendrolaelaps (Pontiolaelaps) terebratus</i> | 92 |
| Dog-shape bowls | 51 |
| <i>Dianthus plumarius</i> | 71 |
| <i>Euphorbia exigua</i> | 72 |
| <i>Fumaria bastardii</i> | 70 |
| Gill, B.J. | |
| Specimens of rare or recently extinct New Zealand non-passerine birds in the Auckland | |
| Institute and Museum | 77 |
| <i>Geranium rubescens</i> | 72 |
| <i>Himantopus novaezelandiae</i> | 80 |
| <i>Iberis umbellata</i> | 70 |
| <i>Illecebrum verticillatum</i> | 71 |
| Intertidal Mesostigmata | 83 |
| <i>Juncus capitatus</i> | 75 |
| Kites | 37 |
| Lawrence, Joan, and Nigel Prickett | |
| Excavations at Pukearuhe (N99/49), North Taranaki, 1968 | 1 |
| <i>Leioseius australis</i> | 96 |
| <i>Lepidium hyssopifolium</i> | 70 |
| Luxton, Malcolm | |
| New species of intertidal Mesostigmata (Acari) from New Zealand | 83 |
| Mahina, 'Okusitino | |
| Observations on a Tongan nose-flute (<i>fangufangu</i>) | 33 |
| <i>Mahonia aquifolium</i> | 69 |
| Maori dog-shape bowls | 51 |
| Maori meeting house | 61 |
| Non-passerine birds | 77 |
| North Taranaki | 1 |
| <i>Paronychia brasiliiana</i> | 71 |
| <i>Parthenocissus tricuspidata</i> | 73 |
| Pendergrast, Mick | |
| Kites and windblown toys from Tikopia, a Polynesian outlier in the Solomon Islands | 37 |

| | |
|---|----|
| <i>Plantago varia</i> | 74 |
| <i>Polygala serpyllifolia</i> | 71 |
| <i>Pontiolaelaps</i> | 83 |
| Prickett, Nigel | |
| Joan Lawrence and — | 1 |
| <i>Prunella laciniata</i> | 74 |
| <i>Pterodroma axillaris</i> | 79 |
| <i>Pterodroma pycrofti</i> | 79 |
| Pukearuhe | 1 |
| <i>Rallus modestus</i> | 80 |
| <i>Sceloglaux albifacies</i> | 81 |
| Simmons, D. R. | |
| Maori dog-shape bowls | 51 |
| The significance of decoration in a Maori meeting house | 61 |
| <i>Solidago canadensis</i> | 73 |
| Solomon Islands | 37 |
| <i>Strigops habroptilus</i> | 81 |
| <i>Stuartina muelleri</i> | 74 |
| <i>Thinornis novaeseelandiae</i> | 80 |
| Tikopia | 37 |
| Tongan nose-flute | 33 |
| Toys | 37 |
| <i>Tritonia crocata</i> | 75 |
| Windblown toys | 37 |

RECORDS AND BULLETIN OF THE AUCKLAND INSTITUTE AND MUSEUM

Instructions for Authors

The *Records* and *Bulletins* contain the results of original research dealing with material in the collections of the Museum, and research carried out by members of the Museum staff in their particular subjects. The fields covered are usually anthropology (archaeology and ethnology), botany, geology and zoology, although any aspect of the Museum's work and collections may be included.

Before completion of a manuscript, authors should refer to papers on a similar subject in the most recently published volume for detail of format required. Any doubts should be referred to the Editor. Standard rules for scientific papers and taxonomy apply; an acceptable guide for style is the New Zealand Government Printing Office Style Book (1981 edition).

Manuscripts should be typed, double-spaced on one side of white International A4 or foolscap sheets, with a 2.5 cm (or 1 inch) margin on *both* sides of page. Two copies of text are required, second copies of figures are preferred but not demanded. Manuscripts should not be in booklet form, but supplied with figures, figure captions, tables with captions above, all separate, with only an indication of position required in the text.

Abstracts are required except for brief papers with adequate title.

Figures (particularly groups of figures) and tables should be composed to page proportions, with due regard to saving space, and must be supplied ready for reduction (where necessary) to the printed page size or less (allowing for captions — above tables, below figures), preferably upright on page but sideways on page accepted (where necessary). Figures for fold-outs will only be allowed in special circumstances. Individual figures (whether grouped or not) should be numbered consecutively in arabic numerals (*not* 1a, b, c, etc) regardless of whether they are photographs or line drawings. Figures and tables *must* be referred to in the text and should be numbered in order of reference where possible.

All measurements must be given in metric (SI) units; equivalents in other units may be given in parenthesis.

Entries listed under "References" *must* be referred to in the text; this may not be necessary for a "Bibliography" or "Selected Bibliography" provided such listing is explained in the text. Book titles need not be abbreviated but names of journals should be abbreviated to known standards (as in "The world list of scientific periodicals" 4th edition, or as in the journal itself, or by a combination of recognised abbreviations), but need not be over-abbreviated. Names of countries may be abbreviated but those of cities or provinces are preferred not abbreviated. English titles of books and papers should be in lower case except for the first letter of names, but names of journals should have all major words beginning with a capital letter. Those of foreign languages should have capital letter usage of the language concerned.

Authors are responsible for the accuracy of their data, references and quotations, for their conclusions and remarks, and also for corrections to proofs. Authors (whether single or joint) will receive 50 free offprints each.

Papers may be offered to the Editor at any time but those received for the *Records* after 31st March of any year may not be considered for publication that year. All papers will be submitted to the Editorial Committee and may be submitted to a referee.

